June 19, 1923. 1,459,660

A. VAN A. FELTEN

MACHINE FOR MAKING RETAINING RINGS FOR RECEPTACLE CLOSURES

Filed March 9, 1922 3 Sheets-Sheet 1

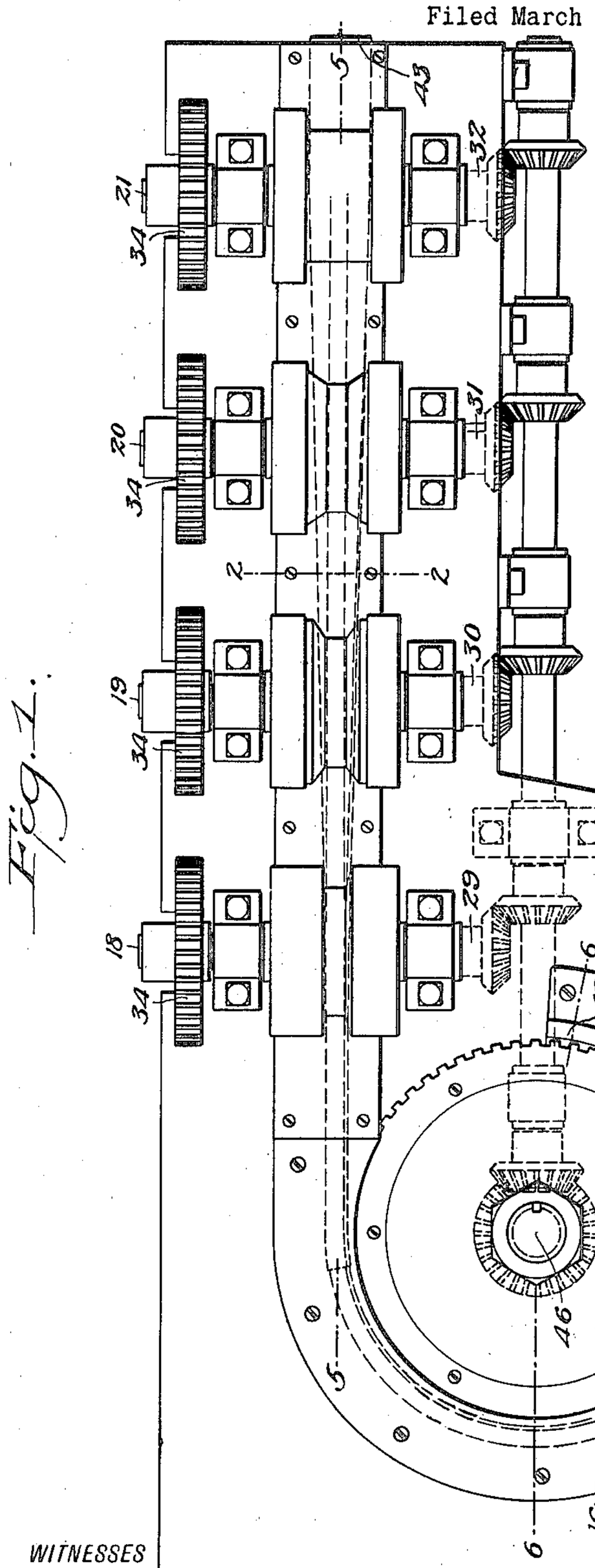

Fig. 1.

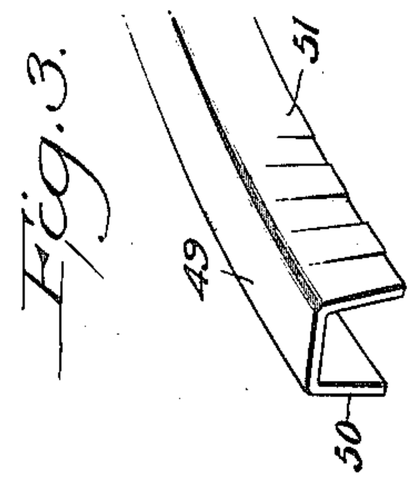

Fig. 3.

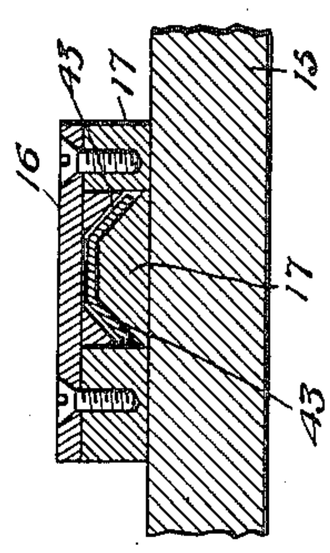

Fig. 2.

WITNESSES

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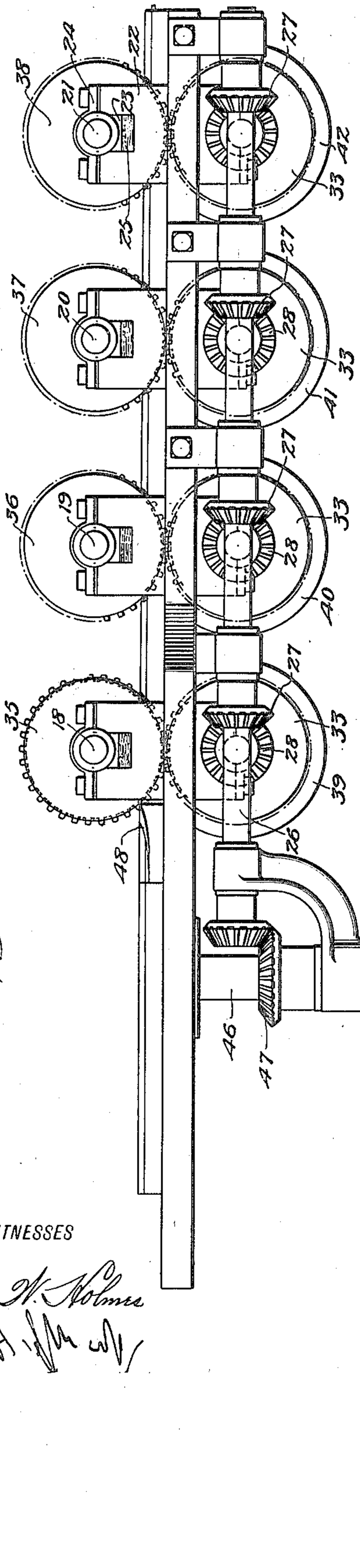

Fig. 4.

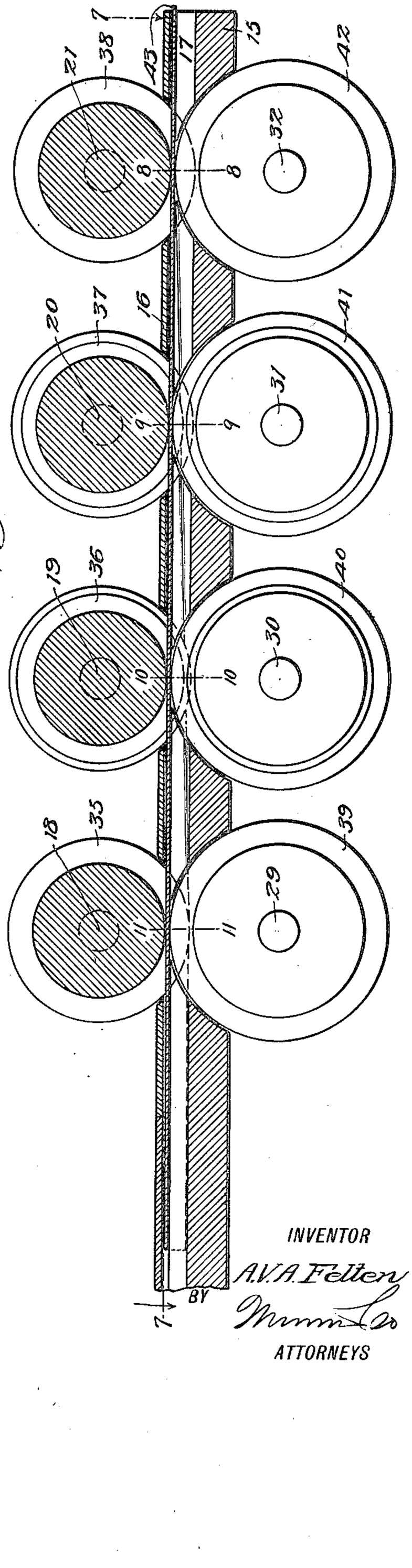

Fig. 5.

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MACHINE FOR MAKING RETAINING RINGS FOR RECEPTACLE CLOSURES

Filed March 9, 1922 3 Sheets-Sheet 3

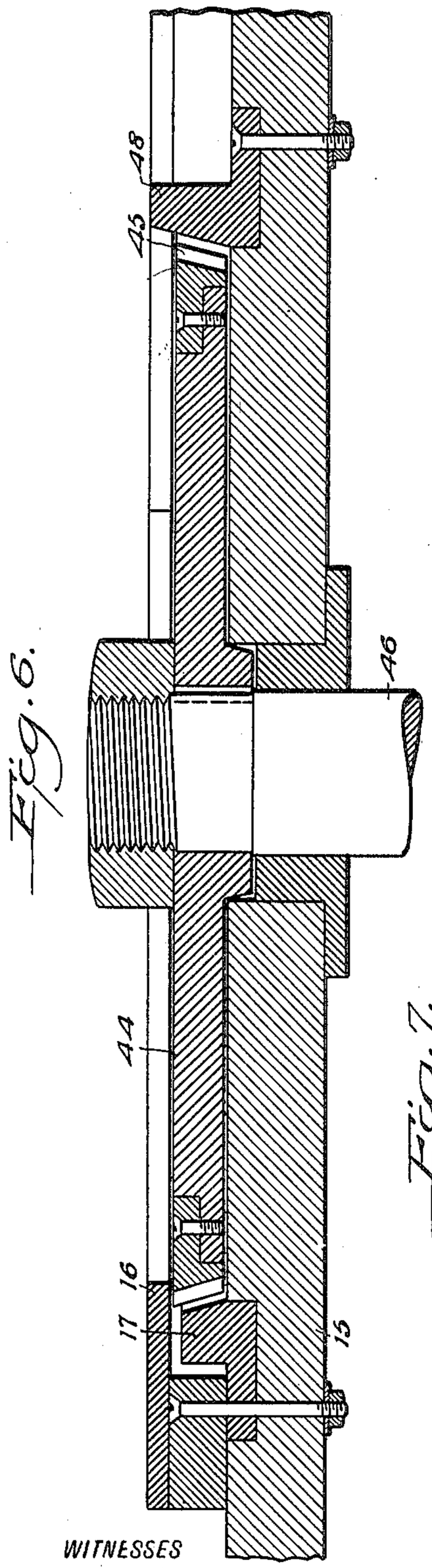

Fig. 6.

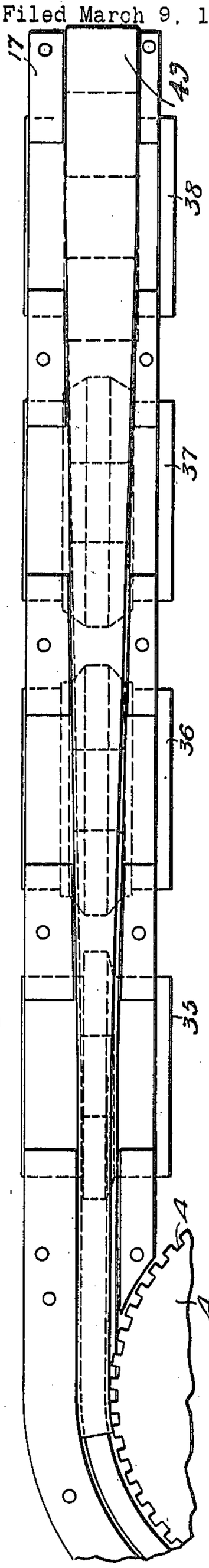

Fig. 7.

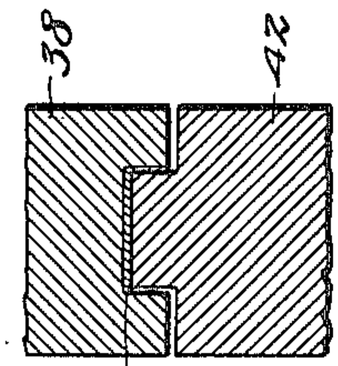

Fig. 8.

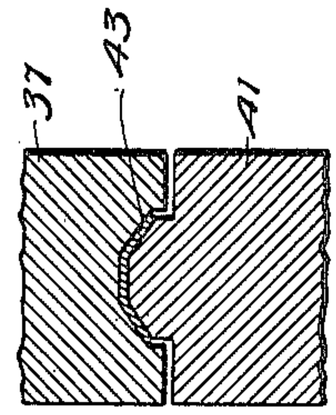

Fig. 9.

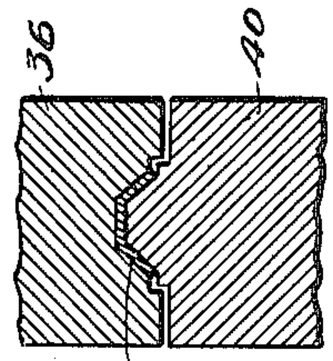

Fig. 10.

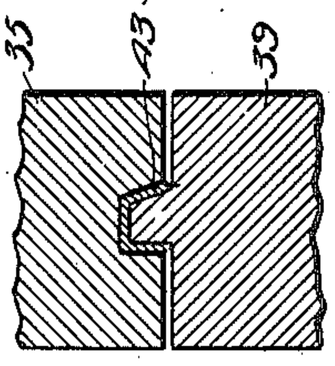

Fig. 11.

WITNESSES

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Patented June 19, 1923. 1,459,660

UNITED STATES PATENT OFFICE.

ABRAM VAN AKEN FELTEN, OF DANBURY, CONNECTICUT, ASSIGNOR TO THE NEW ENGLAND METAL BARREL CORPORATION, OF DANBURY, CONNECTICUT, A CORPORATION OF CONNECTICUT.

MACHINE FOR MAKING RETAINING RINGS FOR RECEPTACLE CLOSURES.

Application filed March 9, 1922. Serial No. 542,501.

To all whom it may concern:

Be it known that I, ABRAM V. A. FELTEN, a citizen of the United States, and resident of Danbury, in the county of Fairfield and State of Connecticut, have invented a new and Improved Machine for Making Retaining Rings for Receptacle Closures, of which the following is a full, clear, and exact description.

This invention relates to a machine for making retaining rings for receptacle closures, and has particular reference to a machine for forming retaining rings, such as disclosed in my Patent No. 1,449,276, issued March 20th, 1923.

Heretofore, difficulty has been experienced in making a ring of the type shown in the above mentioned patent, due to the fact that it has been practically impossible to bend the material into circular formation without distorting the web portion and the flanges forming the side walls of the ring.

The present invention is designed to overcome the above difficulty, and has for one of its objects to provide a machine in which the retaining rings may be readily and economically constructed.

Another object is to provide a machine in which a strip of material is flanged along its longitudinal edges and then bent into the form of a ring with the intermediate or web portion thereof in a plane transverse to the axis of said ring.

Still further objects of this invention will appear in the annexed specification taken in connection with the drawings, which latter illustrate one practical embodiment of the same, and in which;

Figure 1 is a plan view of a machine embodying my improved construction.

Fig. 2 is a transverse sectional view taken along the line 2—2 of Fig. 1.

Fig. 3 is a perspective view of a portion of the ring provided by means of my improved type of machine.

Fig. 4 is a fragmentary side elevation thereof.

Fig. 5 is a longitudinal sectional view taken along the line 5—5 of Fig. 1.

Fig. 6 is an enlarged transverse view taken along the line 6—6 of Fig. 1.

Fig. 7 is a sectional plan view taken along the line 7—7 and in the direction of the arrows illustrated in Fig. 5.

Figs. 8, 9, 10 and 11 are fragmentary enlarged sectional views taken along the lines 8—8, 9—9, 10—10 and 11—11 of Fig. 5.

It will be seen in these views that the reference numeral 15 indicates the table of the machine which has disposed thereabove a curved guide strip 16 which co-operates with a track 17 arranged in the space existing between the body 15 of the table and the strip 16. The track 17 as has been clearly indicated in Fig. 7 is of gradually diminishing width, and interrupted in a number of places so that a series of forming wheels may extend through its body.

These wheels may be of any desirable character, and number, but in the embodiment illustrated where a ring of the nature before mentioned is to be constructed, it will be noted that four sets of these wheels are provided. Thus I provide a plurality of shafts 18, 19, 20 and 21, and these shafts are rotatably supported upon the table 15 by means of pillars 22, it being noted in this connection that these pillars in turn support bearing blocks 23, and clamping blocks 24 with which the shafts 18 to 21 are directly associated. A resilient member 25 is preferably interposed between the base of the bearing block 23, and the pillar 22 so that the associate shaft may be adjusted with respect to the track with that degree of accuracy which is necessary with work of this character.

Each of the shafts aforementioned is positioned at a point adjacent to a point of interruption of the track 17, and with a view of rotating these shafts I may utilize any suitable driving means such as for instance a power shaft 26 extending longitudinally of the table 15, which driving shaft mounts a plurality of beveled gears 27 engaging similar gears 28 affixed to shafts 29, 30, 31, and 32 respectively, these latter shafts being arranged in line with the shafts 18, 19, 20, and 21, and above the opposite side of the said track 17. The shafts 29 to 32 inclusive carry gears 33 adjacent their opposite ends, and these gears mesh with gears 34 secured one to each of the shafts 18 to 21, it being thus obvious that when the

power shaft 26 is rotated, rotation will be transmitted to the shafts 29 to 32 inclusive and from these shafts to shafts 18 to 21.

It will be seen that each of the shafts 18 to 21, and 29 to 32 carry forming rollers, and the rollers on adjacent shafts co-operate with each other. In this connection attention is invited to Fig. 5, as well as Figs. 8 to 11. It will be seen in these views that the shafts 18, 19, 20 and 21 carry rollers 35, 36, 37 and 38, and the shafts 29, 30, 31 and 32 carry rollers 39, 40, 41 and 42. Also it will be seen that the set of rollers 35 to 38 are female while the rollers 39 to 42 are male, as has been clearly indicated in Figs. 8 to 11. Thus assuming that a flat strip 43 is fed into the front end of the machine, and along the track 17 thereof, it will be seen that the said strip will primarily be engaged by the rollers 38 and 42, and the strip will be pressed by these rollers to not alone feed the same into the body of the machine, but also any irregularities will be flattened out by the action of these rollers. The strip will next pass between the rollers 37 and 41, and it will be seen that these rollers will serve to effect a bending of the same into a shallow trough shape, while the subsequent passage of the strip between the rollers 36 and 40 will cause those portions of the strip adjacent the side edges, to be bent downwardly into a more acute angle with respect to the base of the strip to provide a trough shape of greater depth. Finally the strip will be passed between the rollers 35 and 39, and as it is desired in this instance to provide a ring having one of its side walls inclined with respect to the web or intermediate portion thereof it will be noted that this last or final set of rollers bend one of the side walls of the strip to a position at which it extends at right angles to said web, while the second side wall is not bent to this extreme position.

The foregoing operation completes the initial step of strip manipulation, and now with a view of bending said strip into a circular shape to form the retaining ring, attention is invited to the apparatus serving to accomplish the final manipulation of the same, this apparatus being best illustrated in Figs. 1, 4 and 6. It will be noted, referring particularly to this latter construction, that the same preferably embodies the use of a turn table 44 which has its periphery serrated as at 45, and has this portion of its body extending under the curved portion of the strip 16. The turn table 44 is supported upon a shaft 46, and this latter shaft may be revolved by coupling the shaft 26 with the same by means of a gearing 47. Thus the turn table 44 will be simultaneously revolved with the various rollers, and it will be appreciated that, upon the strip being fed from the last pair of rollers, the same will move along the track 17 and have the outer face of its inner inclined side wall engaged by the serrations 45 of the turn table 44, its inner face slidably bearing against the track 17, which latter is shaped throughout its entire length to conform to the shape assumed by the strip 43 and which has the curved portion thereof disposed in the same horizontal plane as its straight portion. These serrations, although serving primarily to feed the strip around the track, which is now curved, also form minute bends in the inner wall of the same, as has been shown in Fig. 3. Thus the material will be simultaneously bent and fed under the strip 16 to present a circular appearance conforming to that of the track extending around the turn table. Thus the side walls of the ring will be bent transversely and the web portion bent so that the plane thereof will be disposed transversely or angularly with respect to the axis of the ring. With a view of feeding the formed ring clear of the machine it will be noted, reference being had to the figures aforementioned, that the rear end of the track 17 is raised as at 48, and the strip 16 terminates short of this portion of the track, so that the ring may freely move out of contact therewith.

From the foregoing it will be appreciated that a ring is provided having the finished appearance of that shown in Fig. 3 and includes a base 49, the outer side wall 50 extending substantially at right angles to the said base, and the inner side wall 51 inclined with respect to the base 49, and crimped throughout its entire length.

Also it will be understood that, by means of my improved type of machine aforedescribed, all of the objects of this invention are accomplished, and it will further be appreciated that numerous modifications of structure might readily be resorted to without in the least departing from the scope of my claims, which are:

1. In a machine for making retaining rings for receptacle closures, means for bending a strip of material to form a web portion and angularly disposed flanges, and means for further bending said strip to form a ring with the web portion of the strip disposed in a plane transecting the axis of said ring.

2. In a machine for making retaining rings for receptacle closures, means for bending a strip of material to form a web portion and angularly disposed flanges, and means for further bending said strip to form a ring with the web portion of the strip disposed in a plane transverse to the axis of said ring.

3. In a machine for making retaining rings for receptacle closures, means for bending a strip of material to form a web portion and angularly disposed flanges, and means for further bending said strip to

form a ring with the web portion of the strip angularly disposed with respect to the axis of said ring.

4. In a machine for making retaining rings for receptacle closures, a series of rollers between which a strip of material is fed to bend said strip to form a web portion and flanges, and a rotary element to which said strip is fed from said series of rollers and which further bends said strip to form a ring with the web portion of the strip disposed in a plane transverse to the axis of said ring.

5. In a machine for making retaining rings for receptacle closures, a series of rollers for bending a strip of material to form a web portion and angularly disposed flanges, and a rotary element about which said strip is passed to further bend the same, said rotary element having its axis of rotation transverse to the axes of said rollers.

6. In a machine for making retaining rings for receptacle closures, a series of rollers for bending a strip of material to form a web portion and angularly disposed flanges, a rotary element about which said strip is passed to further bend the same, said rotary element having its axis of rotation transverse to the axes of said rollers, and a track over which said strip passes as the same is bent and having a portion arranged concentrically with respect to said rotary element.

7. In a machine for making retaining rings for receptacle closures, a series of rollers for bending a strip of material to form a web portion and angularly disposed flanges, a rotary element about which said strip is passed to further bend the same, said rotary element having its axis of rotation transverse to the axes of said rollers, and a track forming a guide for said strip while it is being bent and having a portion thereof extending between rollers of said series, said track also having a portion arranged concentrically relative to said rotary element, one extremity of the latter portion being inclined with respect to the remainder thereof.

8. In a machine for making retaining rings for receptacle closures, means for bending a strip of material to form a web portion and angularly disposed flanges, and a rotary element about which said strip is further bent to form a ring in which said web portion is disposed transversely with respect to the axis of said ring.

9. In a machine for making retaining rings for receptacle closures, means for bending a strip of material to form a web portion and angularly disposed flanges, and a rotary element about which said strip is further bent to form a ring in which said web portion is disposed transversely with respect to the axis of said ring, said rotary element having serrations on its periphery for crimping a flange of said strip as the same is bent around said element.

10. In a machine for making retaining rings for receptacle closures, series of rollers between which a strip of material is passed to progressively bend the longitudinal edges of said strip to form a web portion and angularly disposed side flanges, one of which is arranged at a greater angle to said web portion than the other, and means for further bending said strip to form a ring wherein said web portion is angularly disposed with respect to the axis of said ring.

11. In a machine for making retaining rings for receptacle closures, a track over which a strip of material is fed and having straight and curved portions arranged in the same plane, a series of rollers associated with said track for initially bending said strip to form a web portion and angularly disposed flanges, and a rotary element also associated with said track and about which said strip is subsequently passed to further bend said strip to form a ring, the axis of rotation of said element being transverse to the axes of said rollers.

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