

C. C. PAGE.
CAP FEEDING MECHANISM.
APPLICATION FILED JULY 24, 1907.

3 SHEETS—SHEET 1.



Inventor:
 Clarence C. Page
 by
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 Attys.

953,056.

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3 SHEETS—SHEET 2.

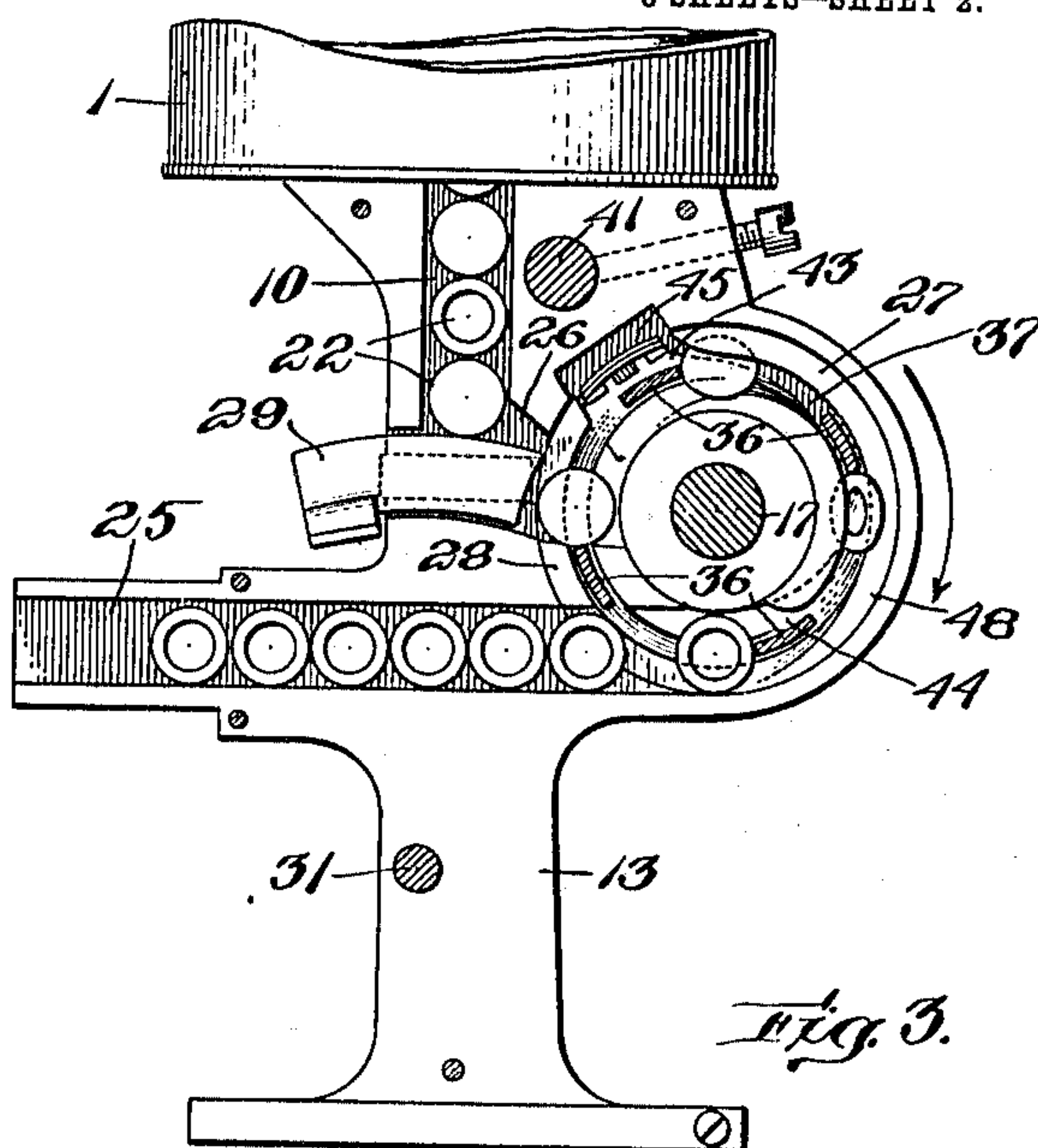


Fig. 3.

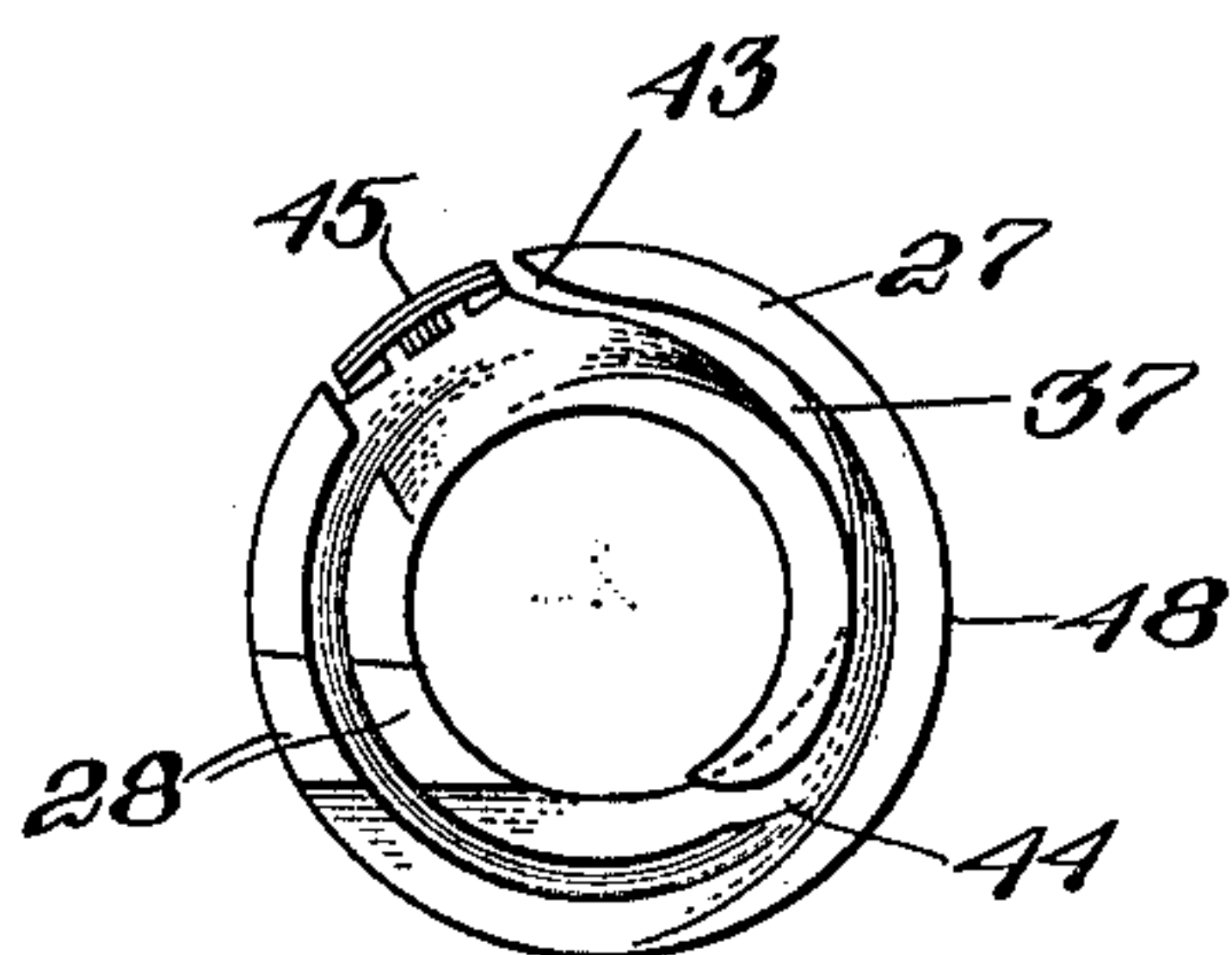


Fig. 2.

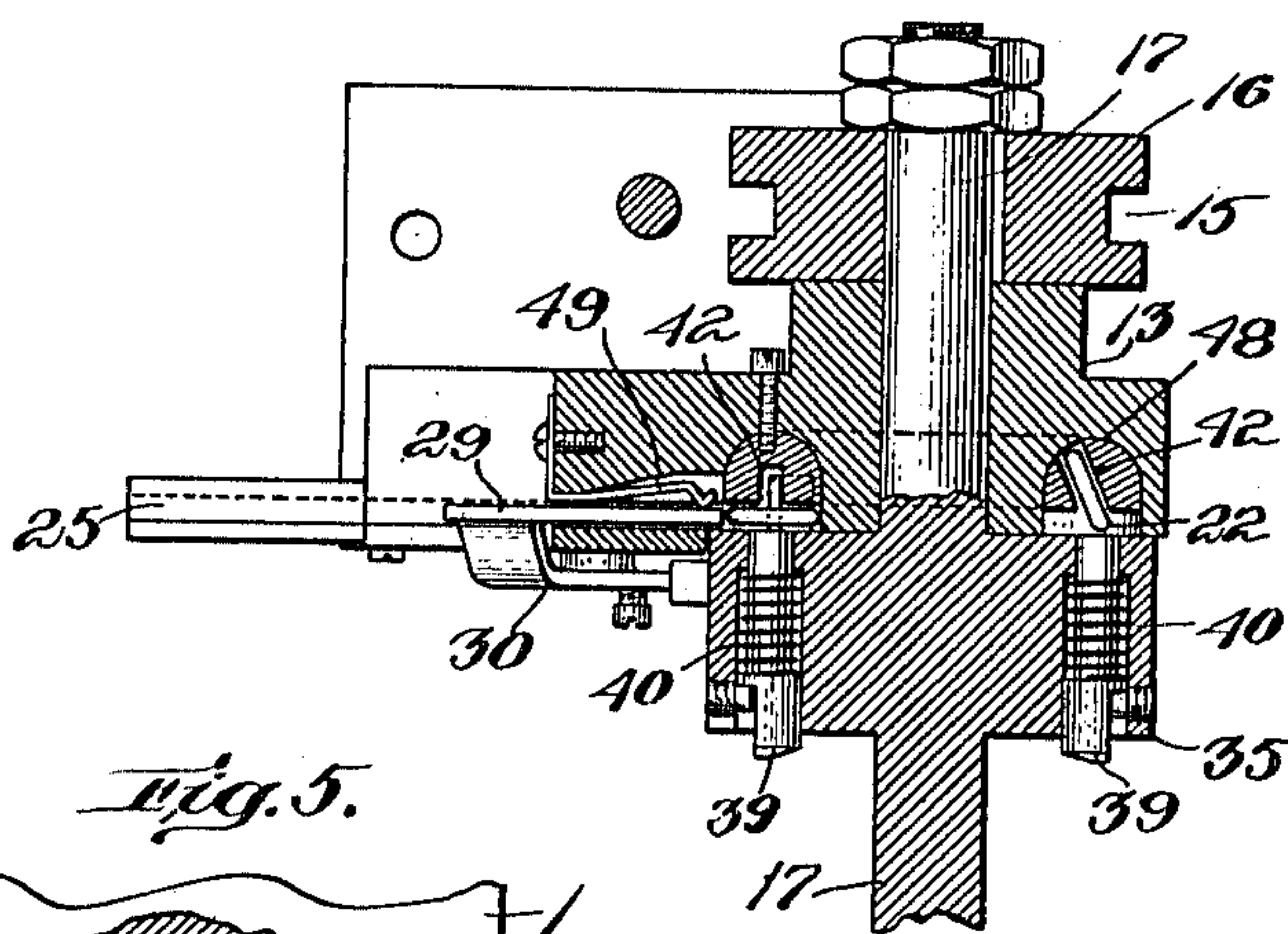


Fig. 4.

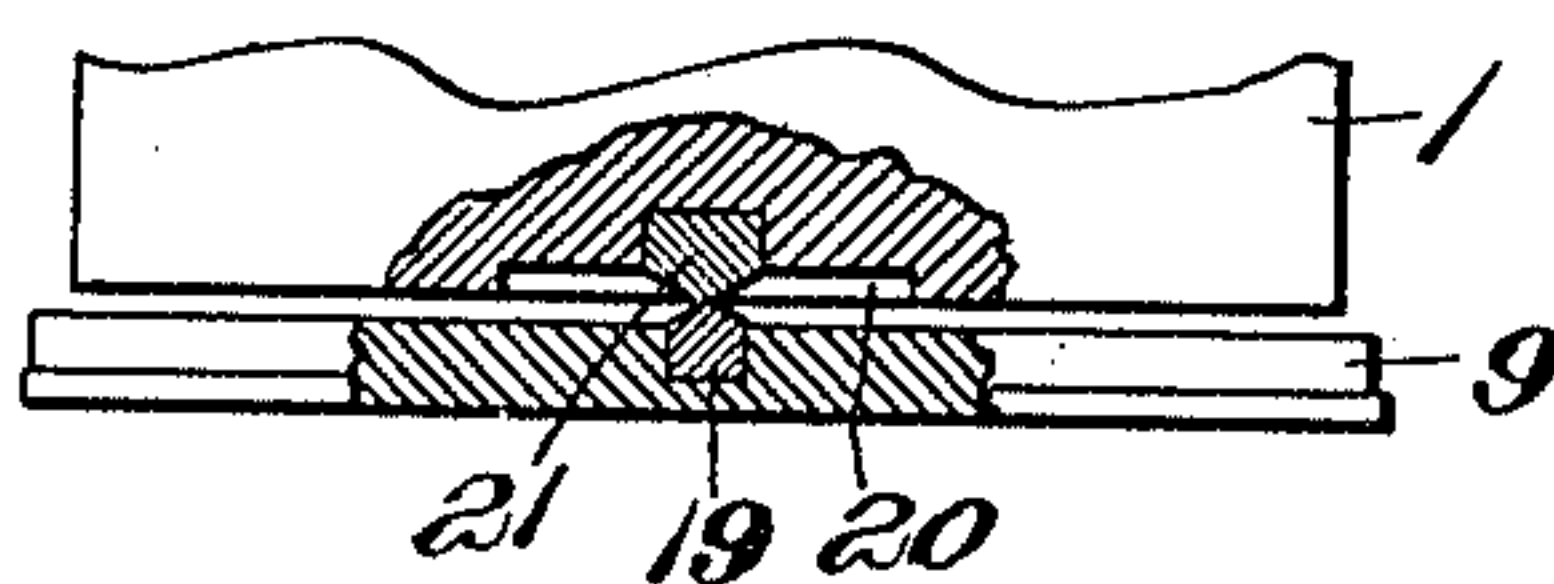


Fig. 5.

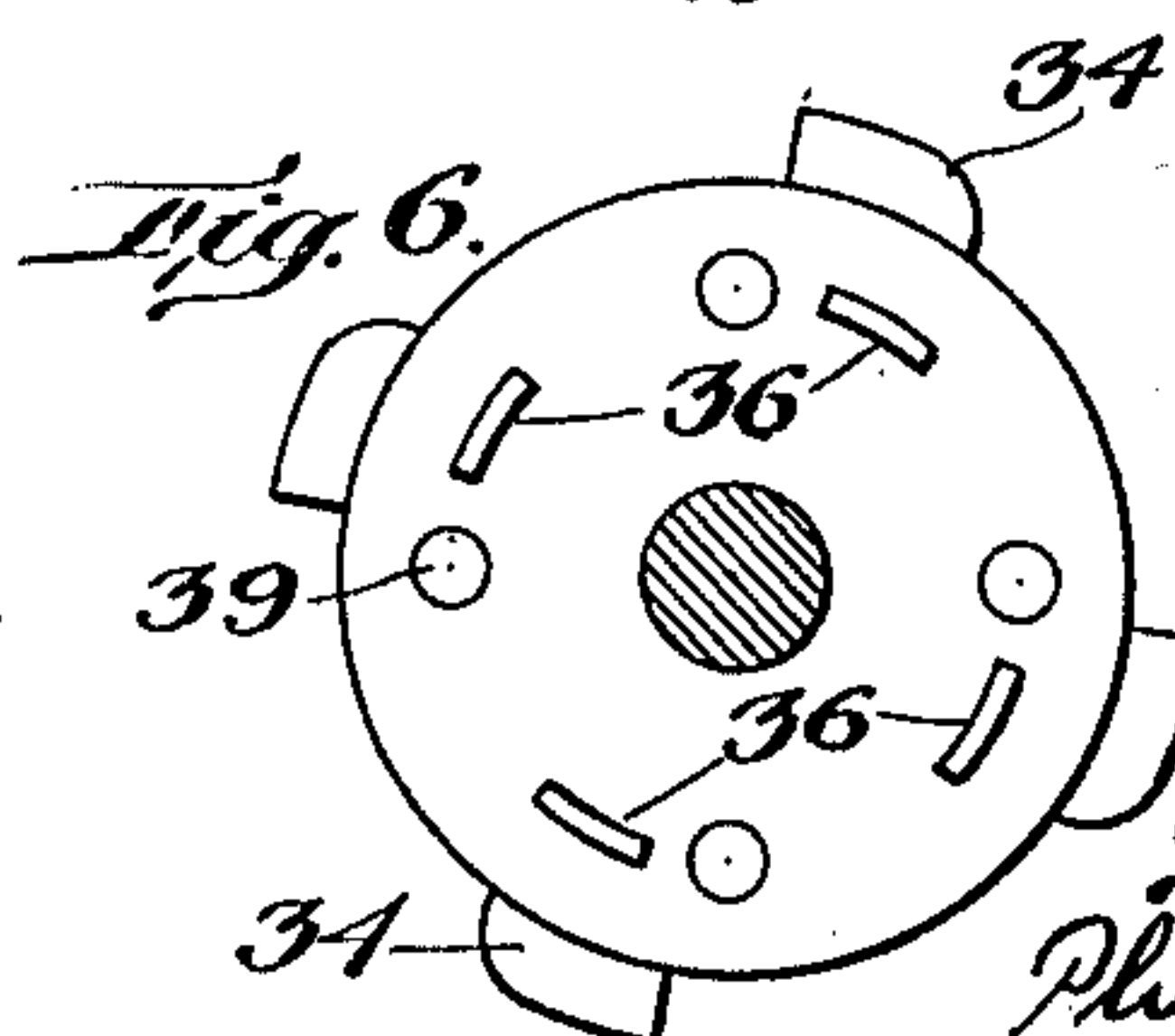


Fig. 6.

Witnesses
A. C. Richardson,
N. D. McPhail

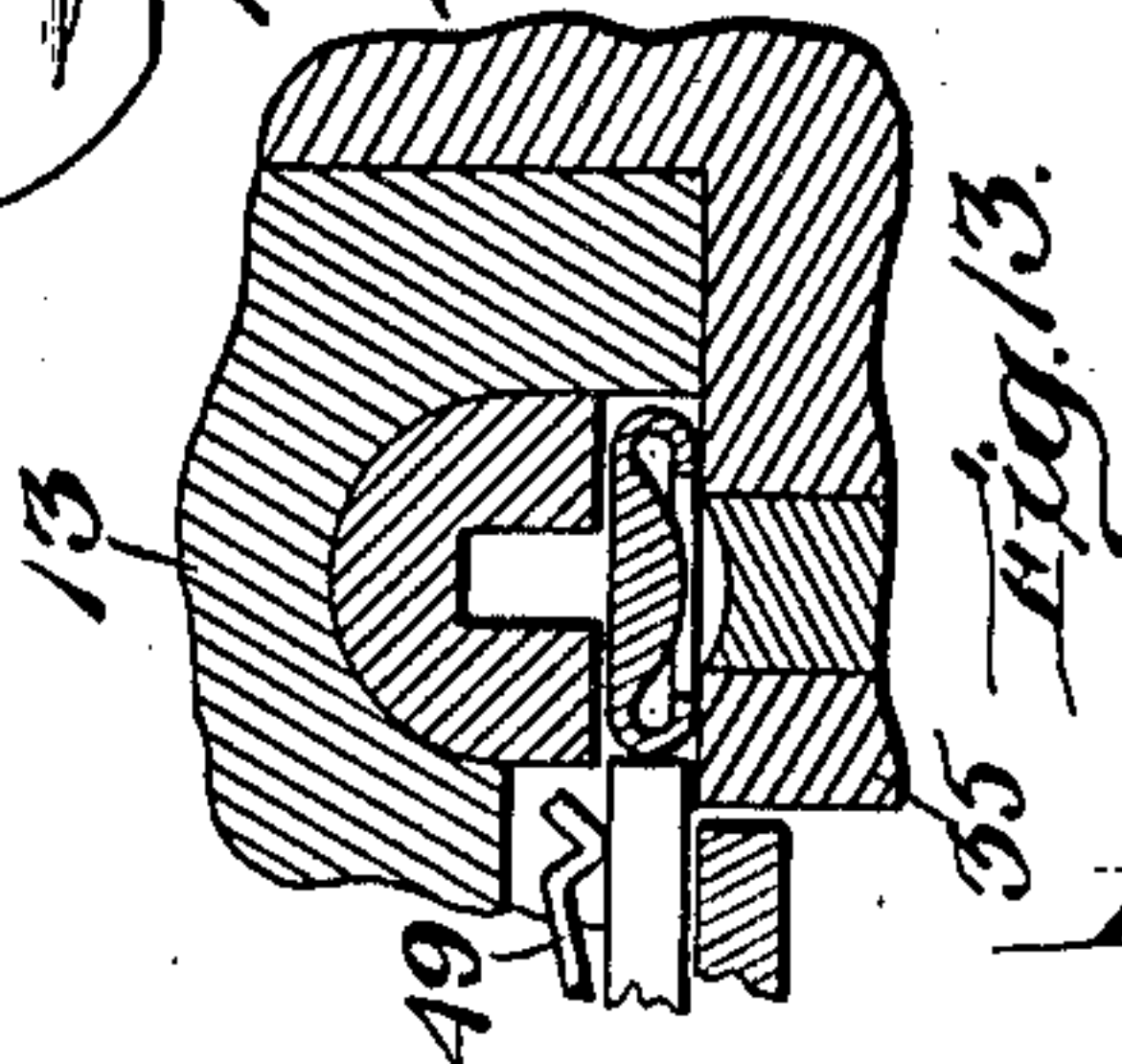
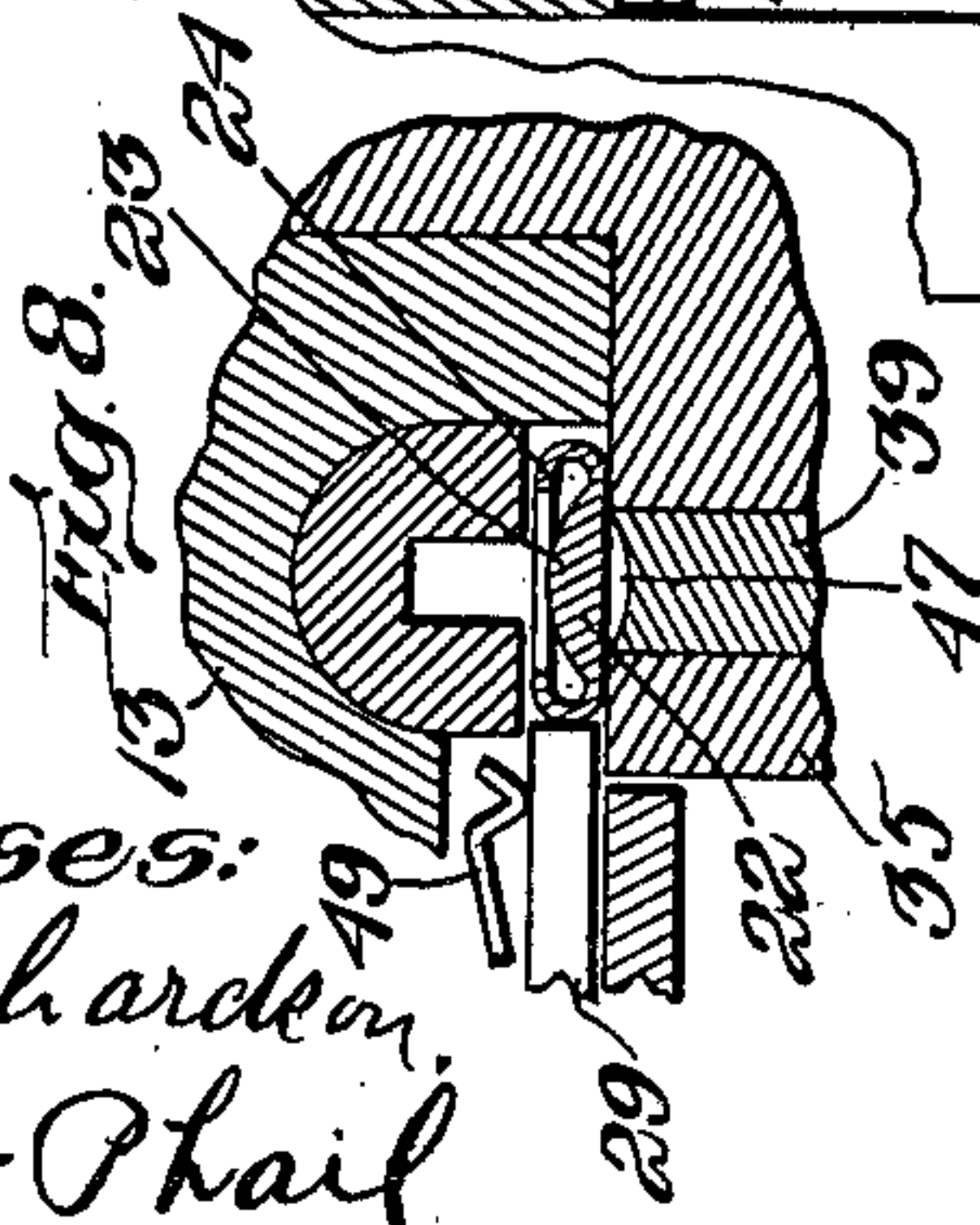
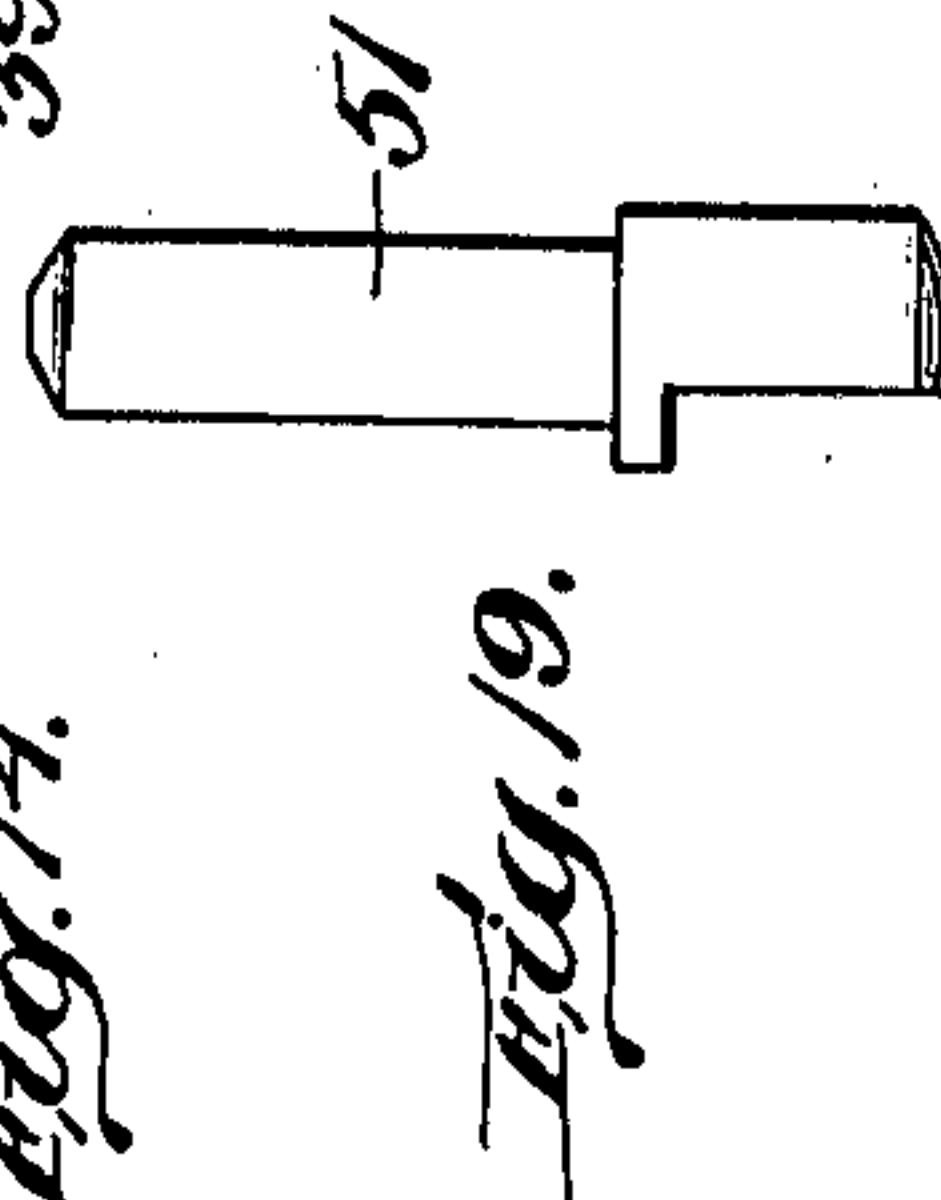
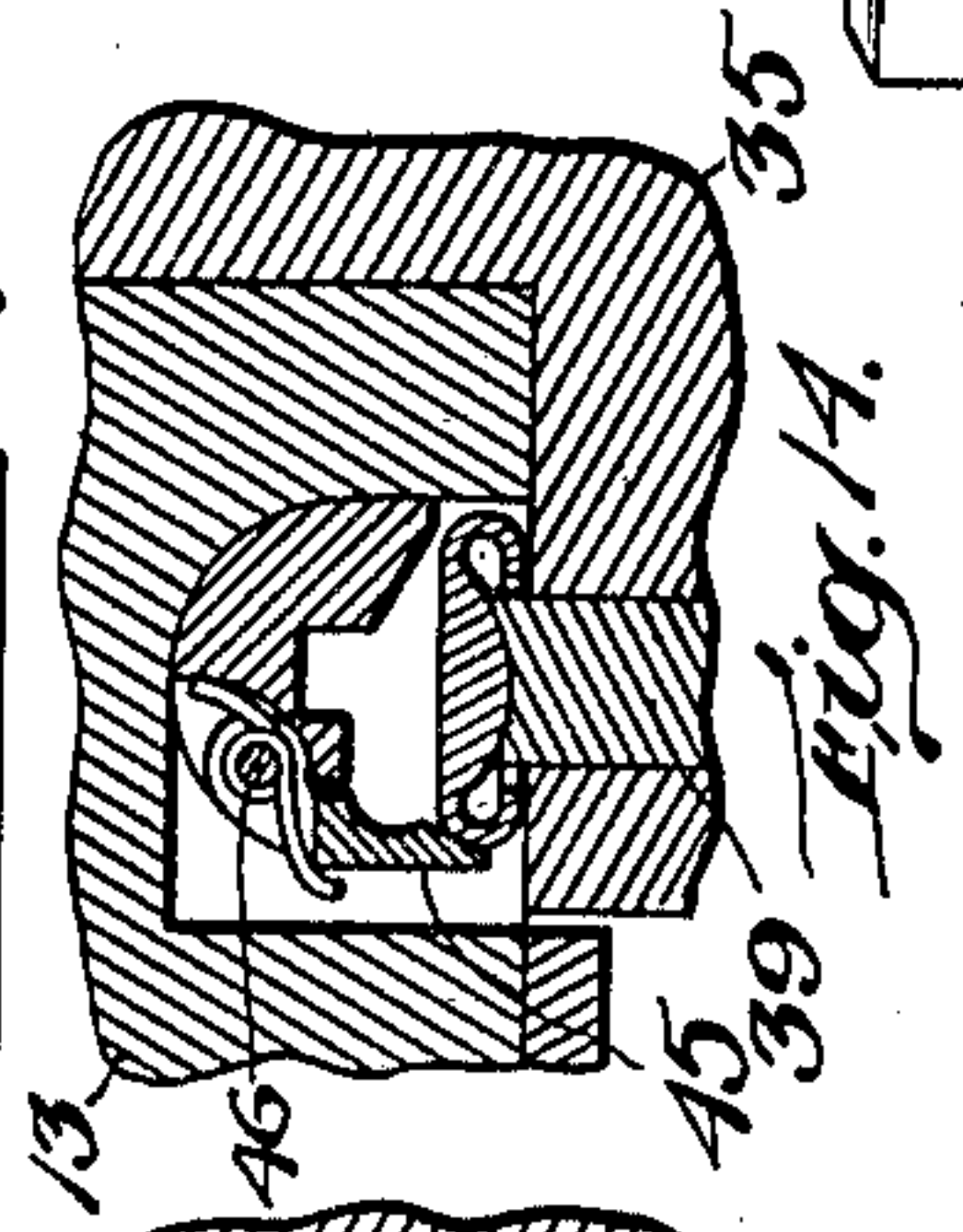
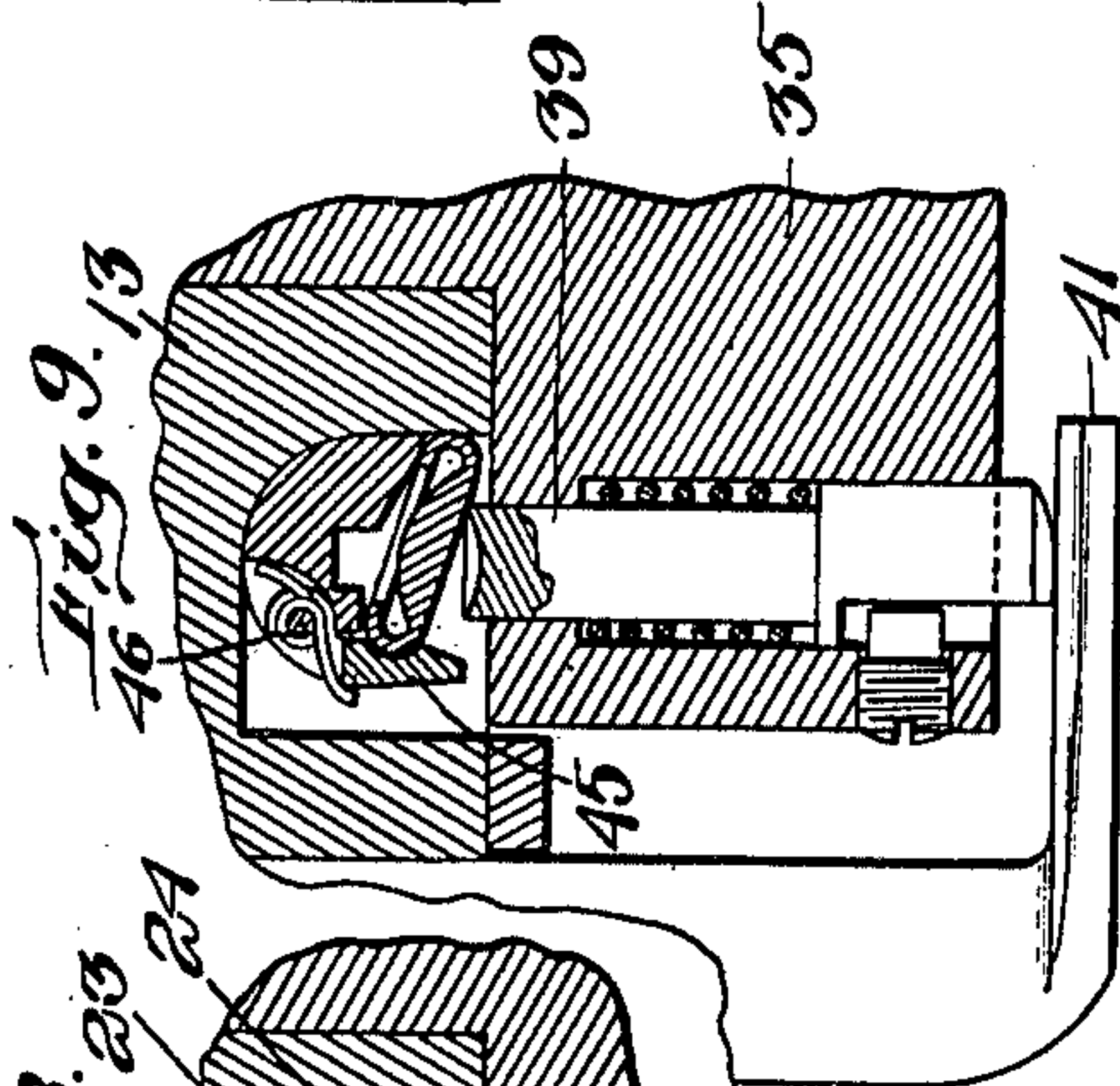
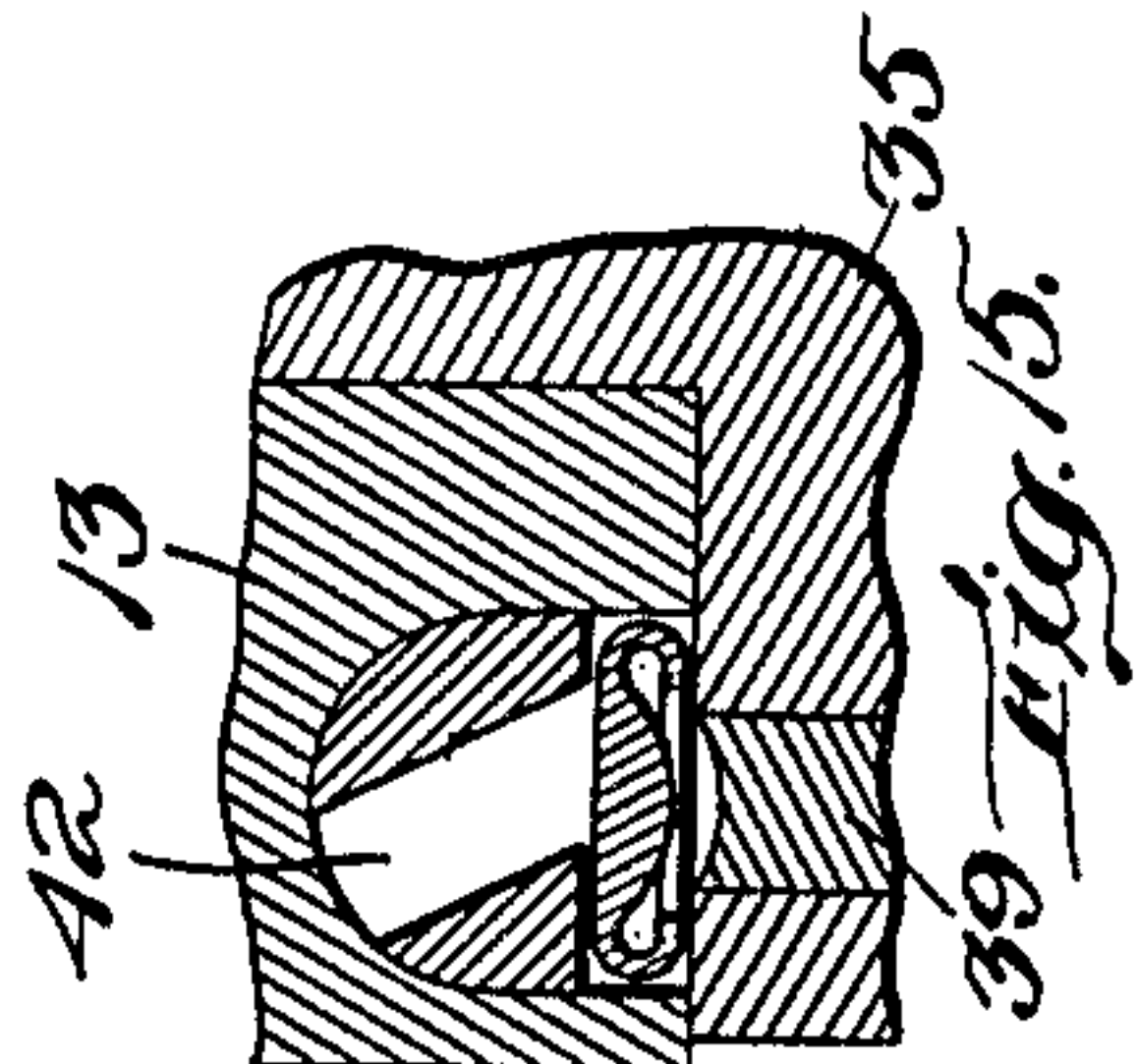
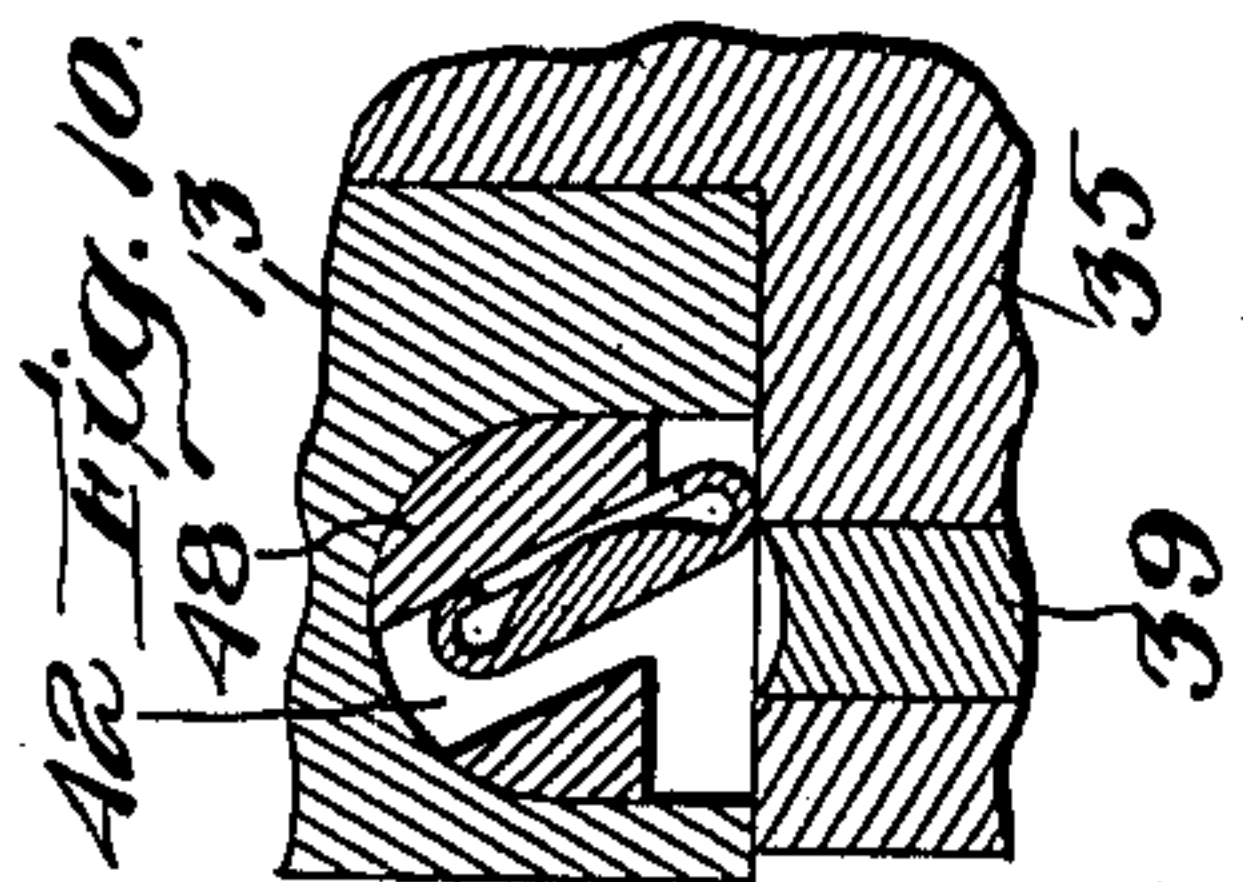
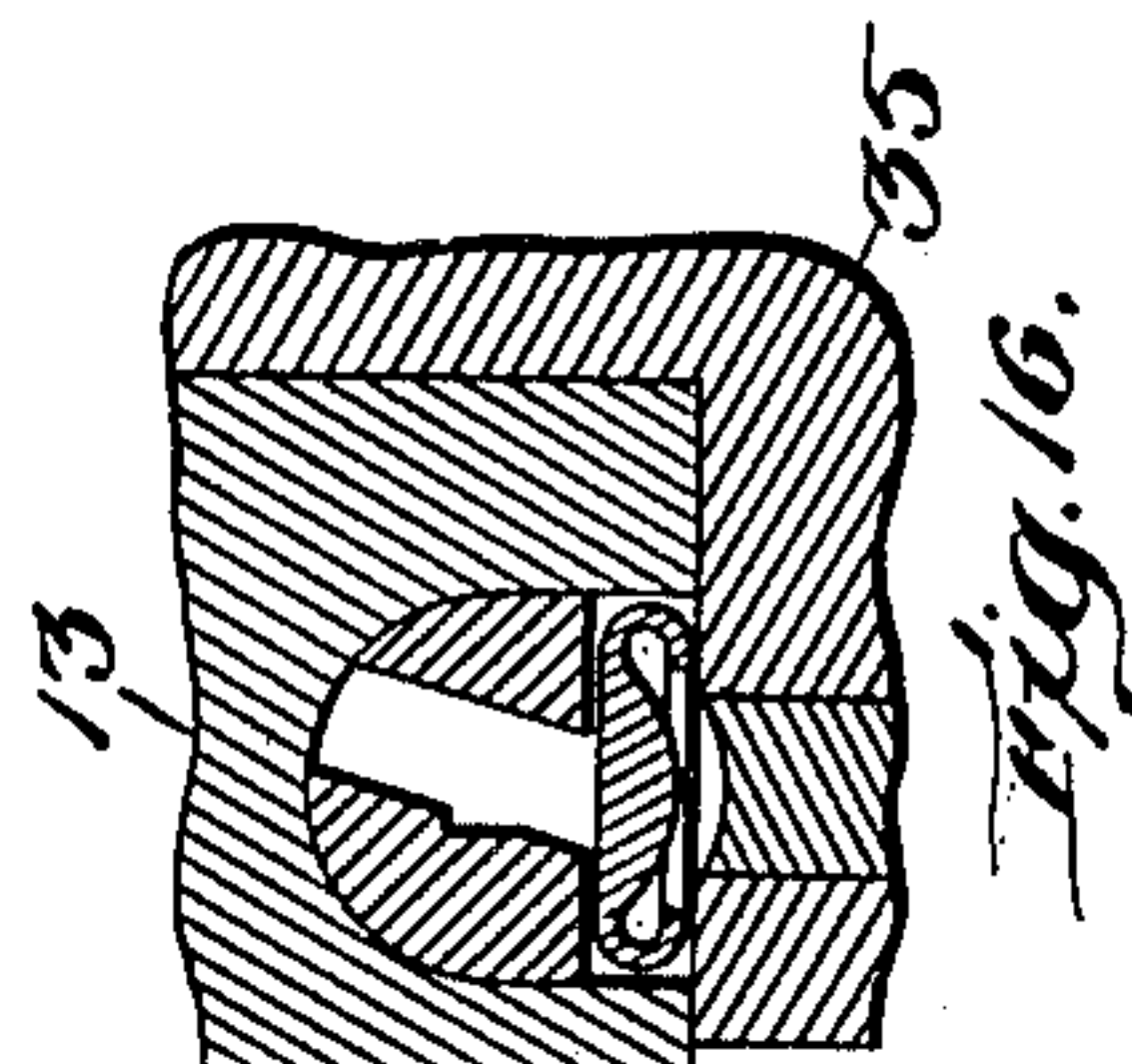
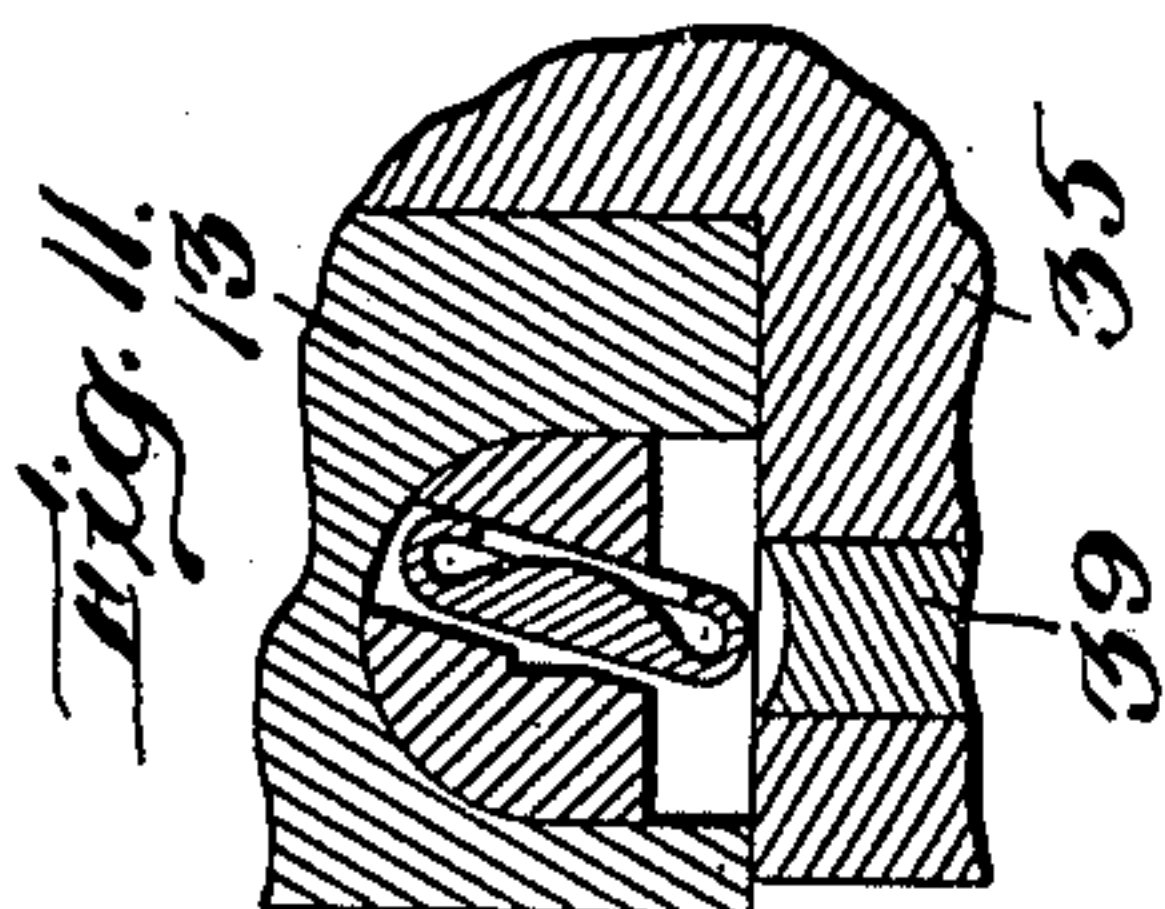
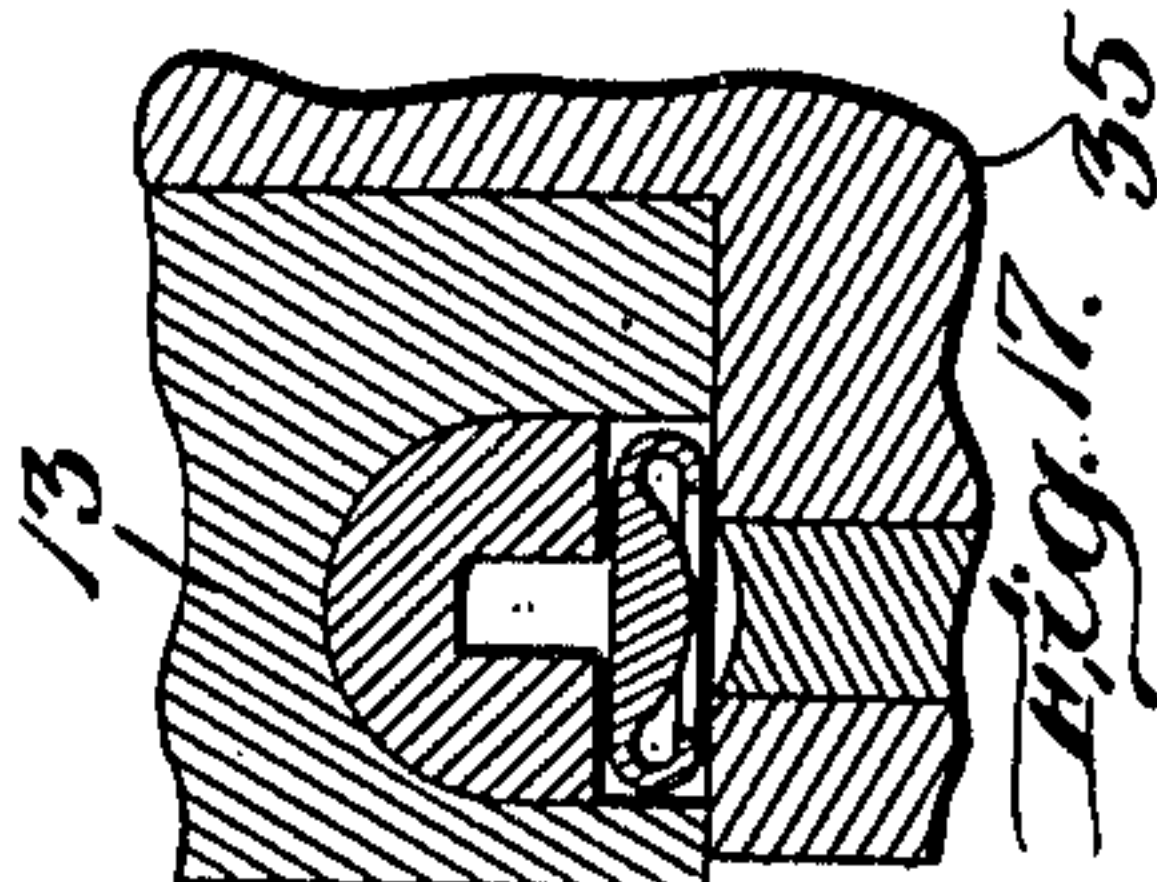
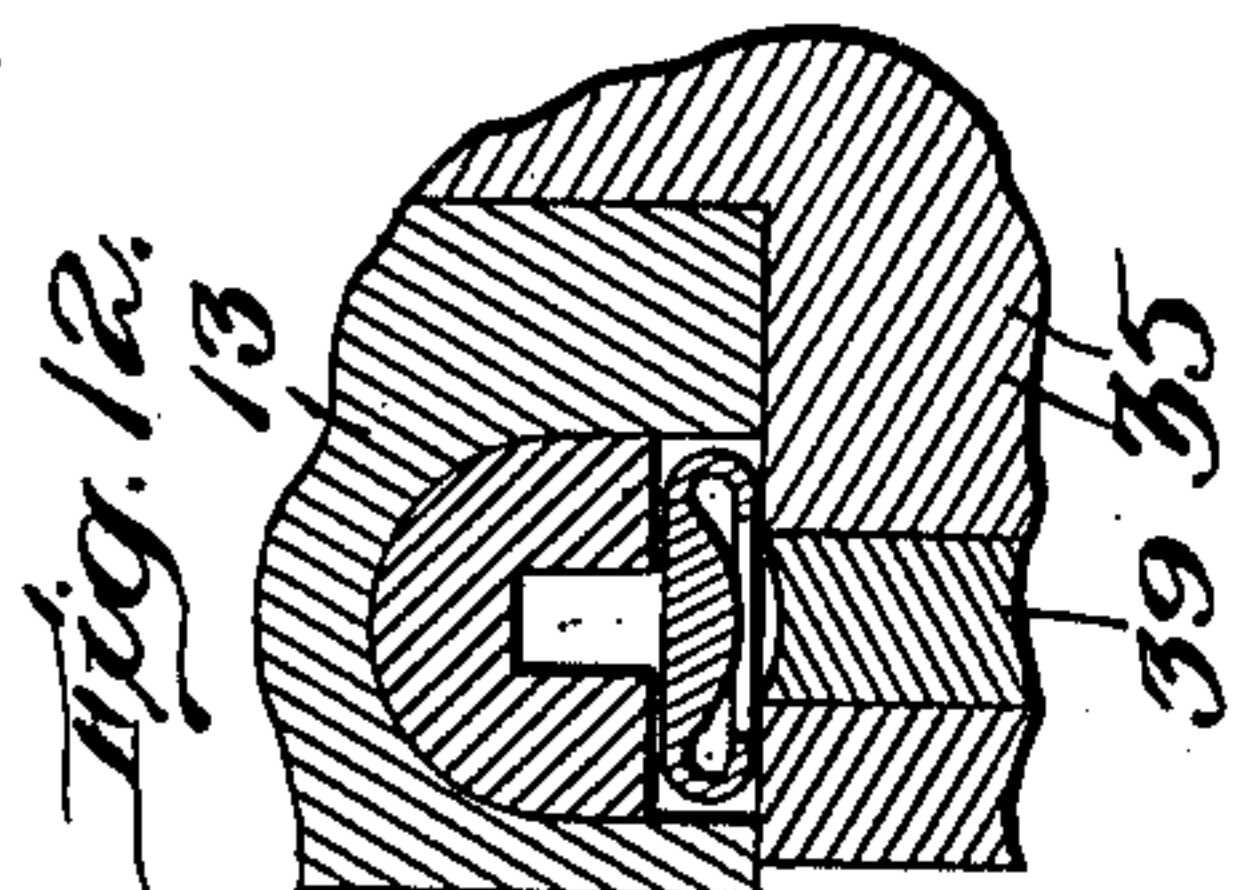
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UNITED STATES PATENT OFFICE.

CLARENCE C. PAGE, OF WOODSTOCK, OREGON, ASSIGNOR TO TUBULAR RIVET & STUD COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

CAP-FEEDING MECHANISM.

953,056.

Specification of Letters Patent.

Patented Mar. 29, 1910.

Application filed July 24, 1907. Serial No. 385,265.

To all whom it may concern:

Be it known that I, CLARENCE C. PAGE, a citizen of the United States, residing at Woodstock, in the county of Multnomah and State of Oregon, have invented certain new and useful Improvements in Cap-Feeding Mechanism; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention relates to feeding devices for handling articles which are differently shaped on opposite sides, and its primary object is to automatically supply a succession of such articles with the similarly shaped sides similarly faced so that individual articles may be presented in uniform relation to devices for further handling or acting upon them.

The invention may be employed to advantage in handling various articles which are differently shaped on opposite sides and which it is desired to present in succession with the similarly shaped sides facing the same way. It may be used with special advantage in feeding articles having a flat or generally discoidal form with similarly shaped peripheral edges, and is well adapted for use in feeding rivet caps such as are commonly secured to the end of rivets in setting them in the material. In further explanation of the invention, the various features thereof will be described in connection with a mechanism specially designed for handling such rivet caps.

In rivet setting machines adapted to secure caps upon the ends of the rivets, it has been customary heretofore to manually place the caps upon the setting anvil, and the rapidity with which the machines have been operated has depended in a great measure upon the experience and dexterity of the operator. By the present invention a feeding mechanism is provided which may be combined with the setting devices and which will operate to automatically feed the rivet caps to the setting device, thus enabling the machine to be run at a higher rate of speed than heretofore, and also insuring the proper presenting of the caps to the setting devices without any skill or care on the part of the operator.

In accordance with one of the principal features of the invention, the rivet caps or

other articles to be handled are fed in a series in which some of the articles may face one way and some another, and this series is acted upon by devices which arrange the articles in the series so that the similarly shaped sides of the articles are faced the same way, the successive articles being thus presented in the same relation so that they may be rapidly and accurately delivered to the setting devices or other devices for handling or acting upon them.

In accordance with a further feature of the invention, the articles are fed in a series in which they may be dissimilarly faced, and those articles which face the same way are directed through the same path, while those articles which face the opposite way are directed out of this path. In practicing this feature of the invention the articles which are directed out of the path referred to may be discharged from the feeding mechanism. These articles are, however, all faced the same way, and they may be presented in succession to setting devices or other devices for acting thereon. This feature of the invention may be utilized in practicing the first feature of the invention above referred to, and in such case the dissimilarly faced articles in the series being fed will be directed through different paths, one of which reverses the articles passing through it and returns them to the same path with the other articles.

In embodying the features above referred to in a simple and efficient form of mechanism which is well adapted for operating upon rivet caps, I have employed certain further features of invention which, while they are not essential to the broader features, are of importance in contributing to the efficient operation of the mechanism and the simplicity of its construction.

The various features of the invention will be understood from an inspection of the accompanying drawings and the following detailed description of the specific mechanism shown therein.

In these drawings Figure 1 is a front elevation partly in section of a mechanism adapted for feeding rivet caps and embodying the various features of the invention in the forms in which I prefer to employ them; Fig. 2 is an elevation partly in section looking toward the left in Fig. 1; Fig. 3 is a partial front elevation with the front plate re-

moved, partly in section, the front plate being removed to show the arrangement of the guideways through which the caps are fed; Fig. 4 is a horizontal sectional view through the axis of the operating shaft; Fig. 5 is a detail showing the devices for agitating the hopper; Figs. 6 and 7 are details of parts to be described; Figs. 8 to 17 inclusive are sectional views showing the manner in which oppositely faced caps are brought into position with the similarly shaped sides facing the same way; Fig. 18 is a sectional view of a cap having a somewhat different shape from that shown in Figs. 8 to 17; and Fig. 19 is a detail showing a part of the mechanism adapted to act upon this different form of cap.

In the mechanism shown in the drawings the caps which are to be fed and presented with the similarly shaped sides facing in the same direction are carried *en masse* in a hopper 1. Projecting from the inner face of this hopper is a downwardly sloping annular plate 2 which directs the caps against outwardly sloping deflector surfaces 3. The deflecting surfaces 3 are concaved and are circularly arranged so that they form a substantial conical deflector for deflecting the caps into the annular space between the inner surface of the hopper and the outer surface of the cylinder. The annular space 5 thus formed between the cylinder 4 and inner surface of the hopper is sufficiently wide to freely receive the caps and the cylinder is provided with a flange 6 having an inclined upper surface which forms a ledge at the bottom of the recess 5 and supports the caps on edge within said space. The upper surface of the flange 6 slopes downwardly from one side of the cylinder 4 in opposite directions, and on the opposite side of the cylinder the flange is cut away at 7 to form an opening between the ends of the flange through which the caps which slide or roll down the inclined upper edge of the flange, may pass. The opening 7 registers with an opening 8 formed in the plate 9 on which the hopper 1 is supported, the opening 8 being of the proper size to allow a single cap to pass freely through it. The opening 8 registers with and forms a part of a guideway 10 which extends vertically downward from the bottom of the hopper 1.

In order to agitate the caps within the hopper and to cause them to pass down over the deflectors 2 and 3 and into the annular recess 5, and also to cause the caps which are thus directed into the recess to be directed one after another into the opening 8 as the caps within the guideway 10 are removed, the cylinder 4 is given an oscillating movement and also a vertical reciprocating movement at suitable intervals. For this purpose the cylinder is secured or formed on the upper end of a shaft 11 journaled in

the plate 9 and in a plate 12 on the supporting standard 13. The shaft 11 is provided with a laterally projecting arm 14 carrying a pin at its outer end which engages a cam groove 15 formed in a drum 16 which is secured to the rotary operating shaft 17. A spring 18 is interposed between the hub of the arm 14 and the plate 9 and tends to hold the bottom of the cylinder 4 against the surface of the plate 9. A V-shaped cam 19 is secured in the plate 9 with its upper end projecting above the surface of the plate and arranged to play within a recess 20 formed in the under surface of the cylinder 4. In the center of this recess 20 a V-shaped cam 21 is secured and arranged so that its lower end is substantially flush with the under surface of the cylinder. As the shaft 17 revolves the shaft 11 and the attached cylinder 4 are oscillated by the cam 15, and during each oscillation the cylinder is raised and lowered as the V-shaped cam 21 rides over the V-shaped cam 19.

The caps 22 which the machine shown is designed to operate upon are discoidal in shape, as indicated in Figs. 8 to 17, one side of the cap presenting a flat plane surface and the other side of the cap being recessed to receive the end of the rivet, and being provided with a spherical spreading surface 23 and an inwardly projecting flange 24. The periphery of the caps curves from approximately the center and merges with the sides so that the peripheral edges of the caps are similarly shaped. The caps which are delivered from the hopper into the guideway 10 may be delivered either with the flat side facing outward or the recessed side facing outward and therefore the series of caps which are delivered to this guideway and which are fed down the guideway by their own weight will be dissimilarly faced. In order that these caps may be properly presented to the setting devices those caps which are faced in the wrong direction must be removed from the feeding mechanism or they must be reversed so that they will face in the proper direction. In the mechanism shown devices are provided which operate to reverse those caps which are improperly faced, so that all the caps in the series delivered to and fed through the guideway 10 are presented with the recessed side facing in the same direction. Certain of these devices might however be employed in case it was desired to discharge the caps which were faced in the wrong direction or to feed one series of caps to one mechanism and another series of caps to another mechanism. The series of caps delivered into the guideway 10 are transferred from this guideway to a second guideway 25 by devices which act to arrange the series of caps so that they all face in the same direction so that the series of caps in the guideway 25 may be

presented successively to rivet and cap setting devices in any suitable manner.

The lower end of the guideway 10 communicates through an opening 26 with a circular raceway 27 formed in the front face of the standard 13 in which the guideways 10 and 25 are formed. The opening 26 extends from the side of the guideway 10 into the side of the circular raceway 27 at its entrance end and the delivery end of the raceway registers with and forms a continuation of the guideway 25, the entrance and exit ends of the raceway being separated by a dividing wall 28. Individual caps are separated from the series of caps in the guideway 10 and delivered into the raceway 27 by means of a separator 29 formed on the upper end of a lever 30 which is pivoted at 31 to the standard 13. The separator lever is held normally in position with the separator across the lower end of the guideway 10 by a spring 32. The separator lever is provided with an arm 33 arranged in the path of a series of cams 34 which are secured to the periphery of a cylinder 35. The cylinder 35 is formed on the shaft 17 and the inner face of the cylinder overlies the raceway 27 and forms the front wall of said raceway. As the shaft 17 revolves the cams 34 strike against the arm 33 of the separator lever, swinging the separator 29 back so that its front end passes from under the series of caps in the guideway 10, thus allowing the caps to feed down the guideway, the lowermost cap passing in front of the separator and into position to pass through the opening 26 into the raceway 27. When the cam 34 disengages the arm 33 the separator 29 is moved forward under the tension of the spring 32, thus forcing the lowermost cap into the raceway 27, the upper surface of the separator passing beneath the next higher cap in the guideway 10 and supporting the series of caps in the guideway. The cap thus fed into the raceway 27 is carried forward by one of a series of feeding fingers 36 projecting from the inner face of the cylinder 35 across the raceway 27 and into an annular groove 37 formed in the rear wall of the raceway. The number of feeding fingers 36 is the same as the number of cams 34 on the cylinder 35 and the feeding fingers are so arranged with relation to the cams that the caps are delivered by the separator 29 directly in front of the feeding fingers. If the cap delivered from the series in the guideway 10 into the raceway 27 has the recessed side facing the front plate 38 which covers the guideways 10 and 25, it is carried around the raceway 27 by one of the fingers 36 and is added to the series of caps within the guideway 25. If the cap is faced the opposite way, however, so that the flat side of the cap is outward, it is deflected out of the raceway 27

by one of a series of deflector plungers 39 which are mounted in the cylinder 35. These deflector plungers consist of pins mounted in the cylinder parallel to the axis of the cylinder and held by springs 40 in retracted position with their front ends substantially flush with the front face of the cylinder. The rear ends of the deflector pins project from the rear face of the cylinder 35 in position to be advanced at the proper time by a cam 41. When a cap is deflected from the raceway 27 it is directed into a second raceway or guideway 42 which is formed at the rear of the raceway 27. The guideway 42 branches off from the raceway 27 at 43, twists through an angle of 180° and returns to the raceway 27 at the point 44. At the entrance end of the guideway 43 the outer portion of the rear wall of the raceway 27 is formed by a spring-pressed bridge piece 45 which is pivoted at 46 so that it may move outward when the cap passing over it is forced rearwardly, and thus allow the cap to be deflected into the guideway 43. The cam 41 which advances the deflector pins 39 is arranged in such position that the deflector pins are advanced as they pass in front of the bridge piece 45. If the cap which is in front of the deflector pin at the time it is advanced is so faced that the recess side of the cap faces the end of the deflector pin, then the end of the deflector pin enters the recess in the cap and does not tend to deflect the cap out of the raceway 27, Fig. 14. The ends of the deflector pins may be recessed as shown at 47 to fit over the convex surface 23 of the cap. If the cap which is in front of the deflector pin is so faced that its flat side is facing the deflector pin, then when the pin is advanced it will strike the flat face of the cap, deflecting the cap into the inclined position indicated in Fig. 9, the bridge piece 45 yielding to allow the outer edge of the cap to swing rearwardly so that as the cap is advanced by the feeding finger 36 it will pass into the guideway 43 and be carried around said guideway by the finger 36. As the cap is carried around this guideway it will be gradually turned through an angle of 180° as indicated in Figs. 9 to 12, and will thus be reversed and returned to the raceway 27 with its recessed side facing outward. Thus the series of caps fed down the guideway 10 will be automatically arranged with their similarly shaped sides similarly faced and be fed along the guideway 25, from which they may be directed to the setting devices.

For convenience in constructing the reversing guideway 43 and gate 45, the guideway 43 is formed in and the gate 45 mounted on an annular ring 48. This ring is substantially semicircular in cross-section, and is mounted within a recess formed in the standard 13, the front face of the ring form-

ing the rear wall of the raceway 27. The dividing wall 28 between the entrance and exit ends of the raceway 27 is also conveniently formed on the front face of this ring.

5 The caps may be retained in the guideway 10 when the separator plate 29 is withdrawn by a spring retaining finger 49, the laterally projecting end of which normally lies across the opening 26 between the lower
10 end of the guideway 10 and the entrance end of the raceway 27. This spring retaining finger yields to allow the passage of the caps when pushed forward by the separator plate 29 as indicated in Figs. 8 and 13.

15 The same construction which has been described may be utilized for handling the form of caps indicated in Fig. 18 by replacing the deflector plungers 39 with deflector plungers having their front ends
20 formed to enter the concave recess 50 which is formed in the back of the cap. Such a plunger is indicated at 51 in Fig. 19. In case the mechanism is provided with a plunger such as shown at 51 and caps such as
25 shown at Fig. 18 are placed in the hopper, the caps which enter the raceway 27 with the recess 50 facing the ends of the plungers 51 will not be deflected out of the raceway 27, while those caps which are oppositely
30 faced when they enter the raceway 27 will be deflected by the plungers into the reversing guideway 43 and will be reversed and delivered to the guideway 25 faced the same way that the caps which pass through the
35 raceway 27 are faced.

The specific form and arrangement of the parts of the mechanism may be modified or changed to suit the particular form and shape of the articles being handled, or other
40 forms and arrangements of devices may be employed in practicing the broader features of the invention.

Having explained the nature and object of the invention and described in detail one
45 form of mechanism in which it may be embodied, what I claim is:

1. A feeding mechanism, having, in combination, devices for feeding a series of articles having differently shaped sides and
50 the peripheral edges of opposite sides similarly shaped and movable devices for directing dissimilarly faced articles into different paths, substantially as described.

2. A feeding mechanism, having, in combination, devices for feeding a series of articles having differently shaped sides and
55 the peripheral edges of opposite sides similarly shaped and devices for directing dissimilarly faced articles through different paths, one of which reverses the articles passing therethrough and returns them to the same path with the other articles, substantially as described.

3. A feeding mechanism, having, in combination, two guideways for guiding articles
65

having differently shaped sides and the peripheral edges of opposite sides similarly shaped and devices receiving the dissimilarly faced articles from one guideway and delivering them to the other guideway with
70 the similarly shaped sides similarly faced, substantially as described.

4. A feeding mechanism, having, in combination, devices for feeding a series of articles having differently shaped sides and the
75 peripheral edges of opposite sides similarly shaped and movable devices for directing the articles which are faced in one way through the same path and for deflecting the articles which are faced the opposite way out
80 of said path, substantially as described.

5. A feeding mechanism for discoidal articles, having, in combination, a cylindrical hopper, an inwardly inclined annular deflector plate within the hopper, a cylinder
85 within the hopper separated from the inner face thereof a distance approximately equal to the thickness of the articles, a conical deflecting surface on the upper end of the cylinder and an inclined ledge forming the
90 bottom of the recess between the cylinder and hopper, substantially as described.

6. A feeding mechanism for discoidal articles, having, in combination, a guideway, a hopper, means for directing individual articles
95 from the hopper into the guideway, a raceway communicating with the delivery end of the guideway, a reversing branch guideway communicating with the raceway, means for engaging and feeding the articles
100 which are faced in the same way through the raceway, and means for deflecting the articles which are faced in the opposite way into the reversing guideway, substantially as described.
105

7. A feeding mechanism, having, in combination, devices for feeding a series of articles having differently shaped sides, a raceway to which said articles are delivered, a
110 feeding finger for advancing the articles through the raceway, a guideway leading from the raceway, and means for deflecting articles which are faced one way into said guideway, substantially as described.

8. A feeding mechanism, having, in combination, a raceway to which articles having
115 differently shaped sides are delivered, a guideway branching off from said raceway, a yielding bridge piece arranged to support one edge of the articles at the entrance of
120 the guideway, a feeding device for advancing the articles through the raceway, and a deflector constructed to deflect only those articles which are faced a certain way, substantially as described.
125

9. A feeding mechanism, having, in combination, a guideway, a raceway communicating with the end of the guideway, a separator for delivering individual articles
130 from the guideway into the raceway, a feed-

ing device for advancing the articles through the raceway, a second guideway to which the raceway delivers, a reversing guideway branching off from the raceway and returning thereto, and a deflector arranged and operated to direct only those articles into the reversing guideway that are faced a certain way, substantially as described.

10. A feeding mechanism, having, in combination, two guideways, two intermediate guideways merging therewith and adapted to receive articles from one of said guideways faced in opposite directions and deliver them to the other of said guideways faced in the same direction, and means for feeding articles in succession from one of said guideways through the intermediate guideways to the other of the guideways, substantially as described.

11. A feeding mechanism, having, in combination, two guideways for guiding articles having differently shaped sides and devices receiving the dissimilarly faced articles in succession from one guideway and delivering them in the same succession to the other guideway with the similarly shaped sides similarly faced, substantially as described.

12. A feeding mechanism, having, in combination, two guideways adapted to receive dissimilarly faced articles and deliver them similarly faced, and means for engaging and feeding articles in succession through said guideways and directing the correspondingly faced articles through the same guideway, substantially as described.

13. A feeding mechanism, having, in combination, a raceway adapted to receive articles dissimilarly faced, a branch guideway leading from said raceway, a deflector constructed to deflect only those articles which are faced a certain way into the branch guideway, and means for operating the deflector, substantially as described.

14. A feeding mechanism, having, in combination, a raceway adapted to receive dissimilarly faced articles, a branch guideway communicating with the raceway, a deflector constructed to deflect only those articles which are faced a certain way, and means for moving the deflector toward the face of the articles when in register with the entrance to the branch guideway, substantially as described.

15. A feeding mechanism, having, in combination, a raceway adapted to receive dissimilarly faced articles, a branch guideway communicating therewith, means for feeding articles through the raceway and guideway, and deflecting devices constructed to operate upon one face only of the articles, and means for operating the deflecting devices as the articles register with the entrance to the branch guideway, substantially as described.

16. A feeding mechanism, having, in combination, a guideway adapted to receive oppositely faced discoidal articles, two guideways branching therefrom, means for directing those articles faced one way into one of said latter guideways, and laterally moving deflector means shaped to deflect only those articles faced the opposite way into the other guideway, substantially as described.

17. A feeding mechanism, having, in combination, two diverging guideways adapted to guide discoidal articles, deflecting devices and means for operating the deflecting devices to selectively direct articles into the respective guideways according to the way they are faced as they come to the juncture of the guideways, substantially as described.

18. A feeding mechanism, having, in combination, a feeding guideway, a delivery guideway communicating therewith through two guiding passages adapted to receive articles from the feeding guideway faced opposite ways and deliver them to the delivery guideway faced the same way, deflecting devices and means for operating the deflecting devices to selectively direct articles into the respective guideways according to the way they are faced as they come to the juncture of the guiding passages, substantially as described.

19. A feeding mechanism for discoidal articles, having, in combination, a guideway, a hopper from which the articles are directed into the guideway faced opposite ways, a raceway communicating with the delivery end of the guideway, a branch guideway communicating with the raceway, and laterally moving means for selectively deflecting only those articles which are faced one way into the branch guideway, substantially as described.

20. A feeding mechanism for discoidal articles, having, in combination, a hopper, a guideway into which the articles are delivered from the hopper facing opposite ways, a raceway communicating with the delivery end of the guideway, a twisted branch guideway leading from and returning to the raceway, and laterally moving deflecting means selectively cooperating with the faces of the articles to deflect only those articles which are faced one way into the twisted guideway, substantially as described.

21. A feeding mechanism, having, in combination, a raceway adapted to receive dissimilarly faced articles having differently shaped sides, a branch guideway leading from the raceway, deflecting devices and means for operating the devices to selectively deflect only those articles which are faced a certain way into the branch guideway, substantially as described.

22. A feeding mechanism, having, in combination, devices for feeding a series of ar-

articles having differently shaped sides, and means including a movable selective device for delivering the articles with similarly shaped sides similarly faced, substantially as described.

23. A feeding mechanism, having, in combination, a guideway adapted to receive dissimilarly faced articles, and a movable selective device constructed to operate upon the face of the articles and to deflect out of the guideway only those articles which are faced a certain way, substantially as described.

24. A feeding mechanism, having, in com-

bination, a guideway adapted to receive dissimilarly faced articles, an opening in said guideway, means for feeding articles through the guideway, and movable deflecting devices selectively cooperating with the faces of the articles for deflecting through said opening only those articles faced a certain way, substantially as described.

In testimony whereof I affix my signature, in presence of two witnesses.

CLARENCE C. PAGE.

Witnesses:

JOHN A. JEFFREY,

CLINTON A. AMBROSE.