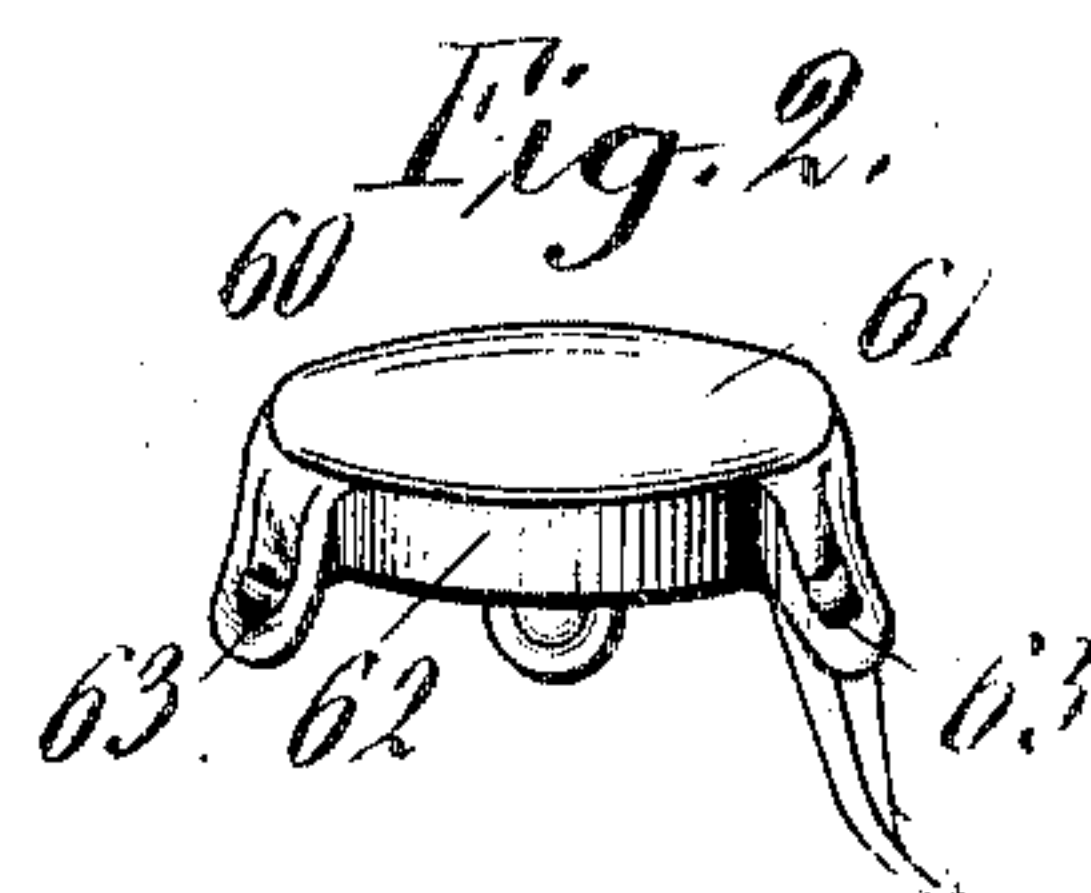


APPLICATION FILED APR. 19, 1907.

Patented Nov. 24, 1908.

3 SHEETS—SHEET 1.



WITNESSES:

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AUTOMATIC FEED CAPPING MACHINE.
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904,879.

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3 SHEETS—SHEET 2.

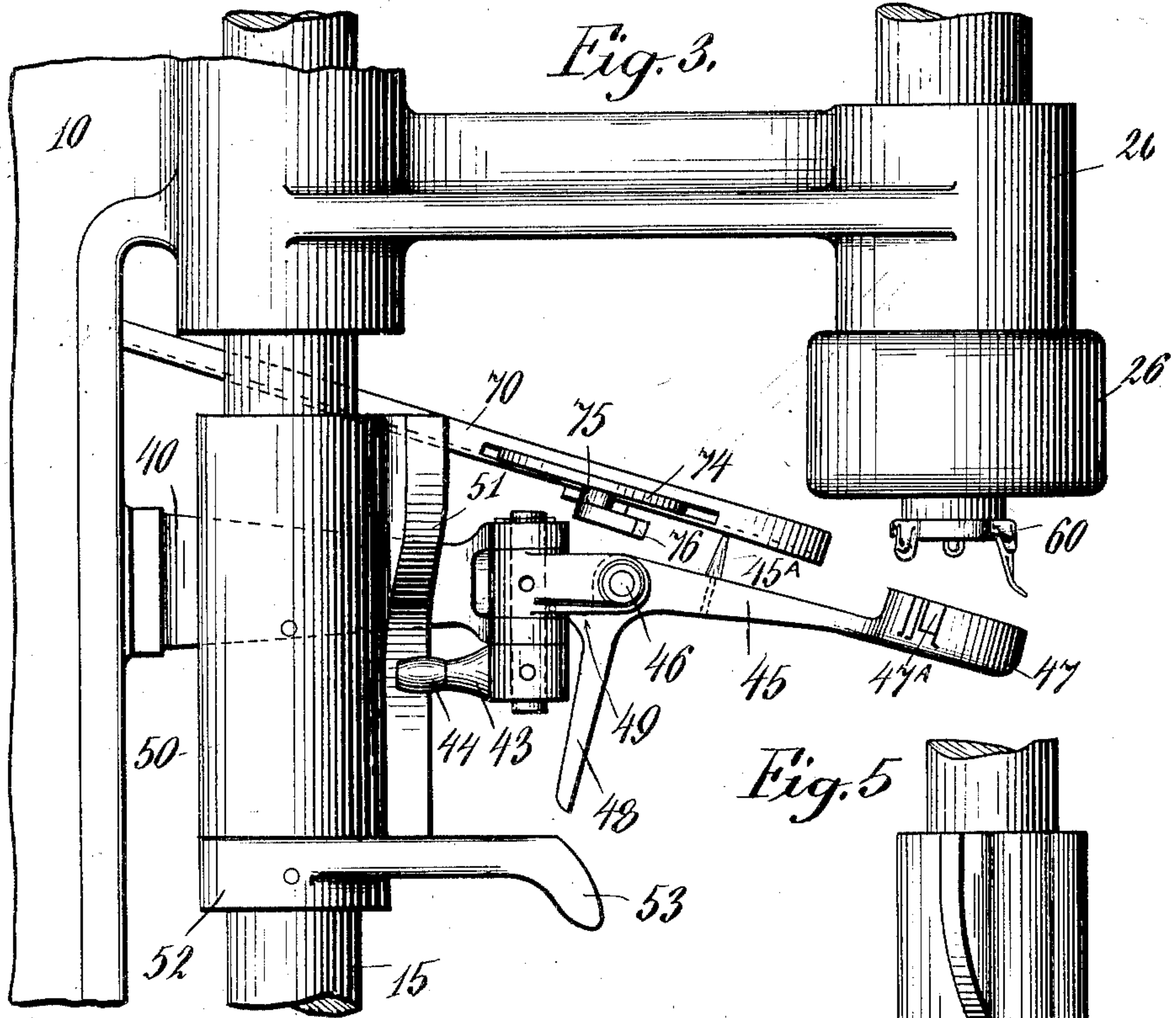


Fig. 5

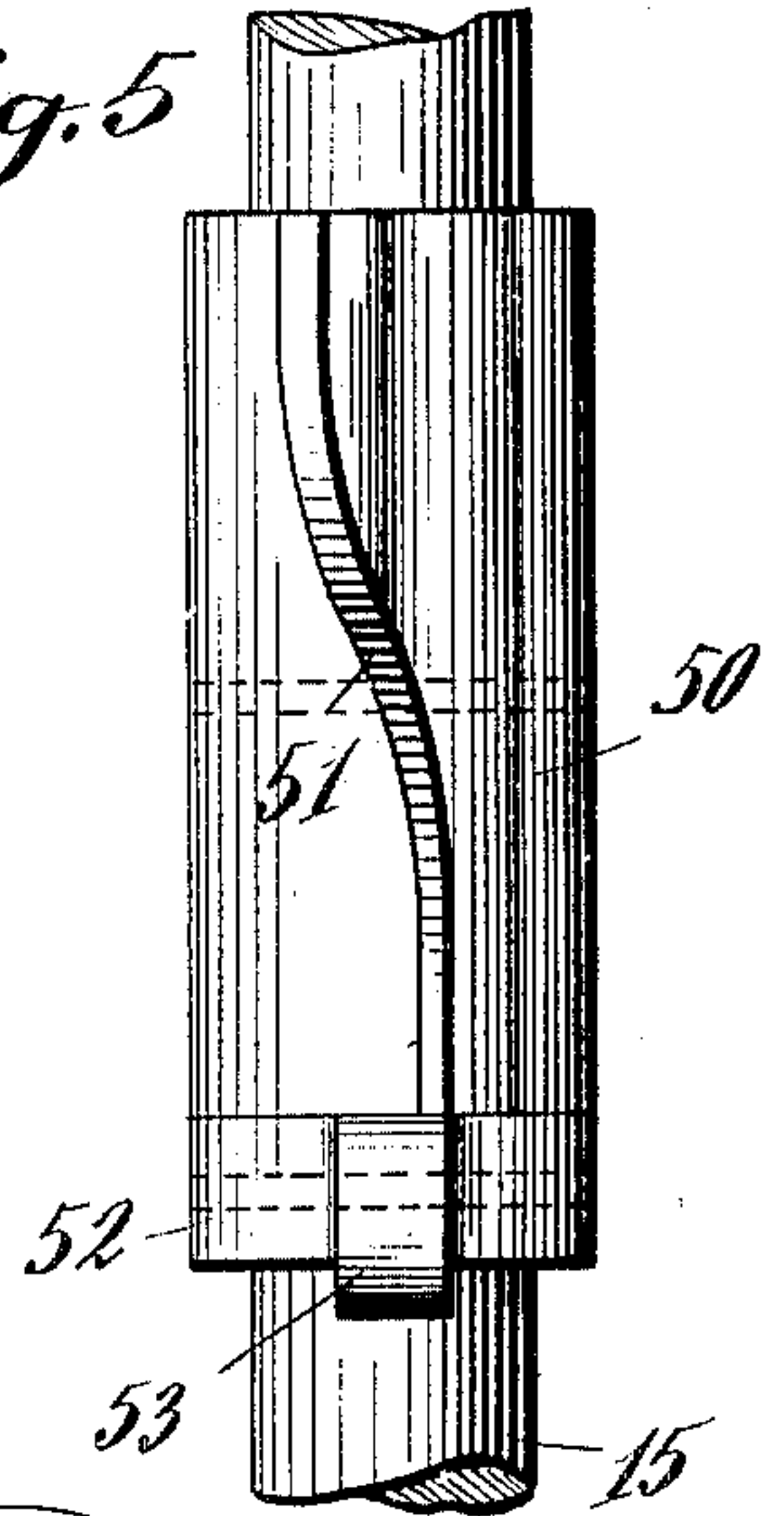
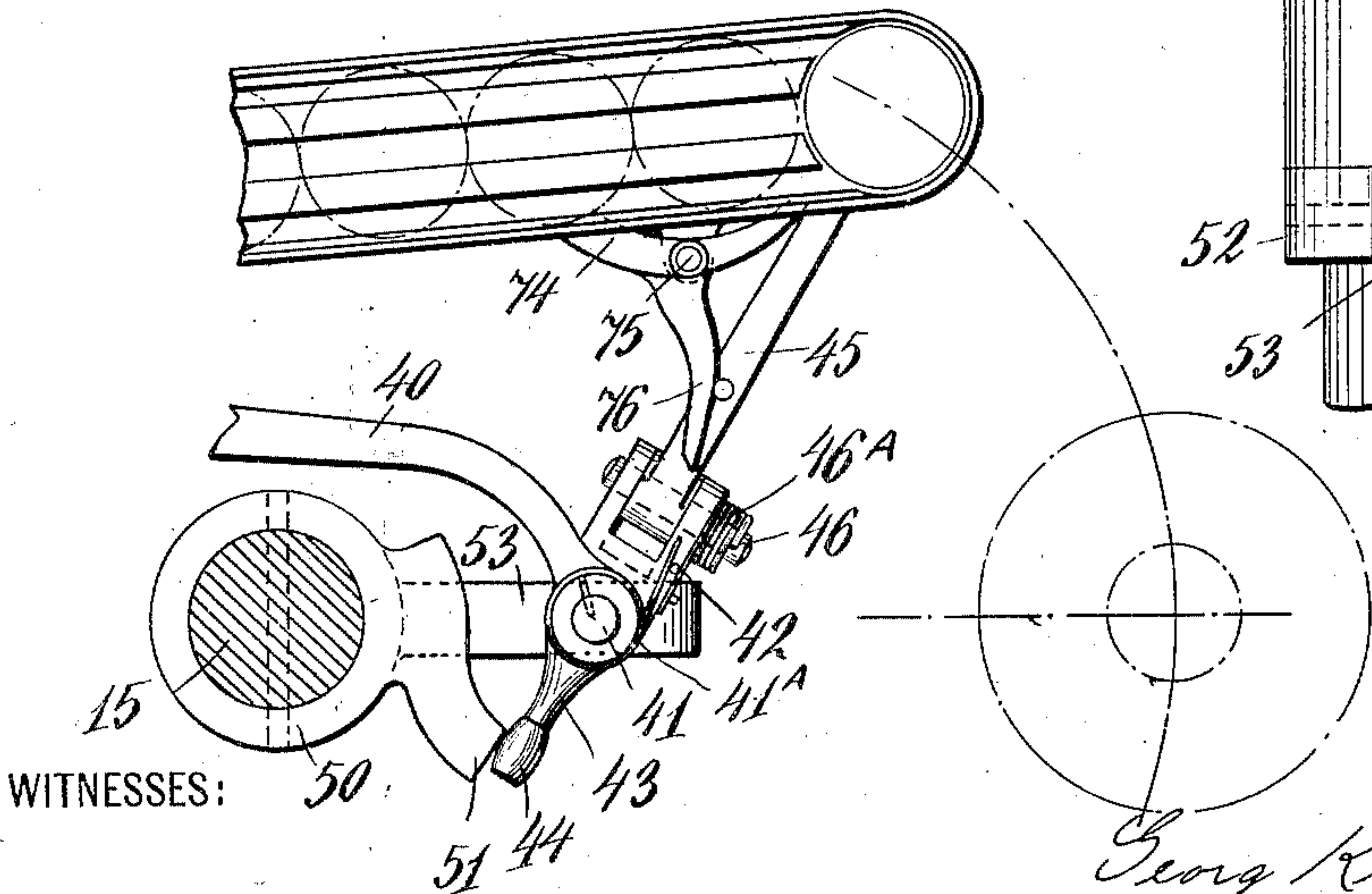


Fig. 4.



WITNESSES:

William A. Hoeneman
Witness

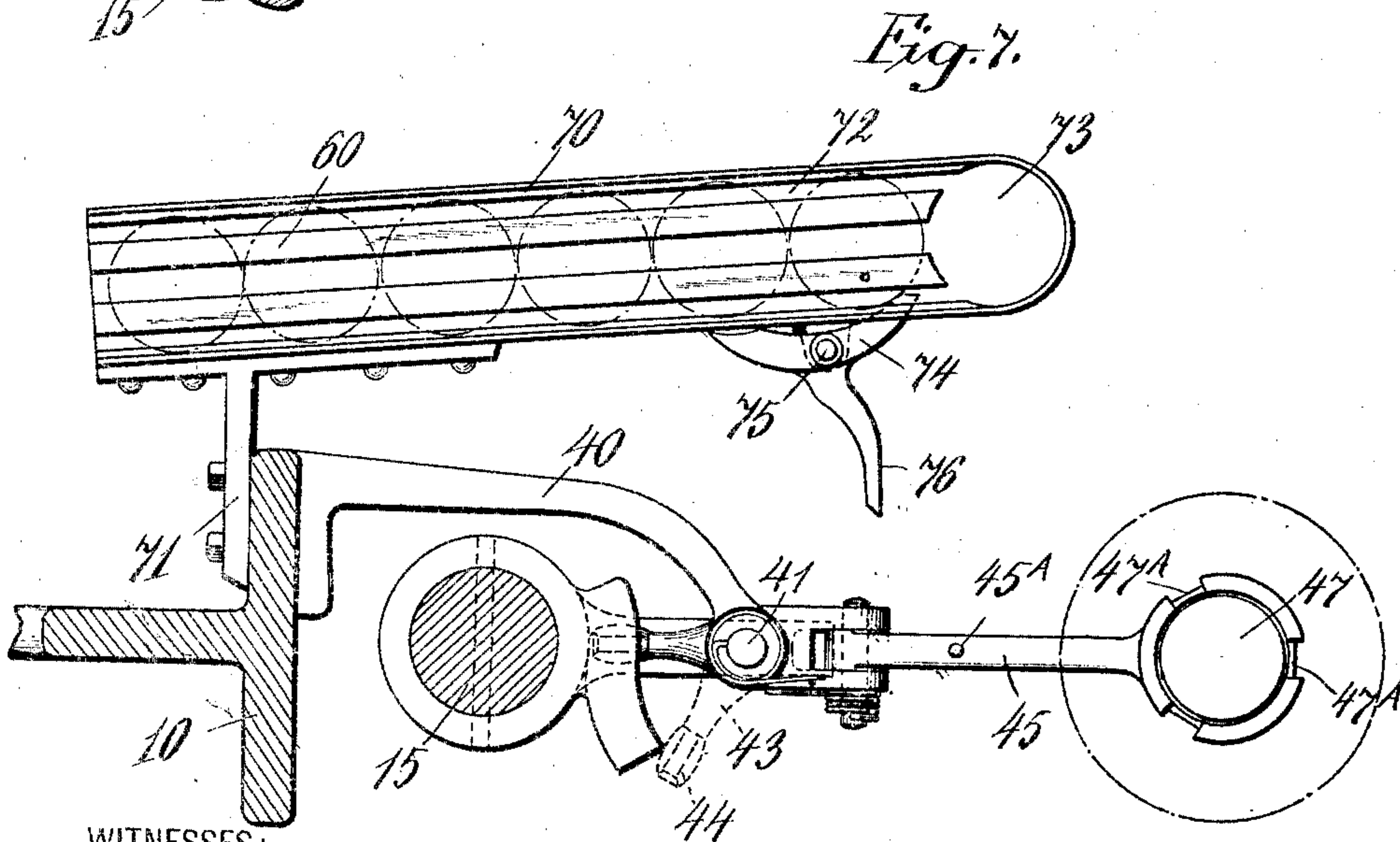
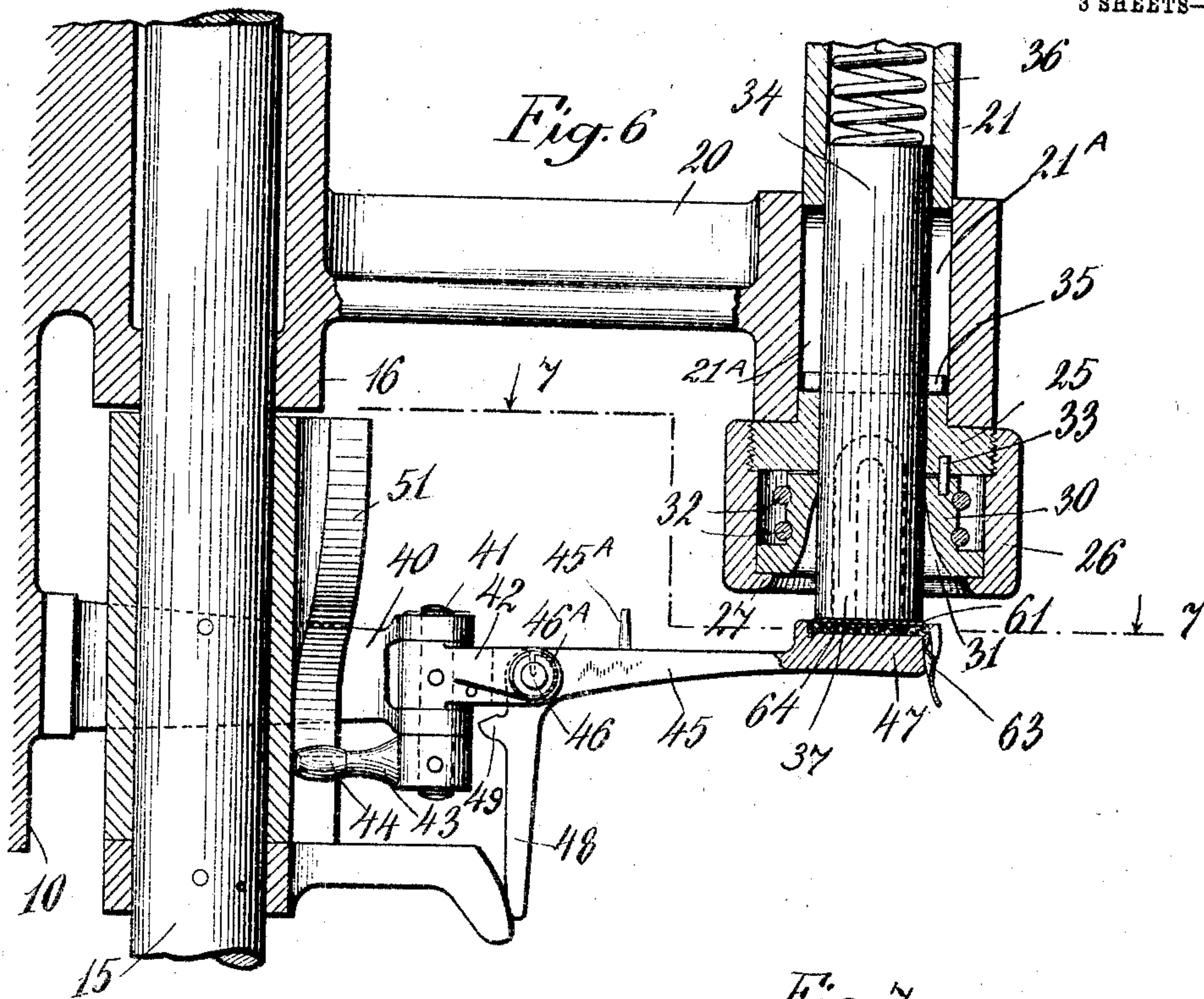
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UNITED STATES PATENT OFFICE.

GEORG KIRKEGAARD, OF NEW YORK, N. Y., ASSIGNOR TO IMPERIAL STOPPER COMPANY, A CORPORATION OF MAINE.

AUTOMATIC-FEED CAPPING-MACHINE.

No. 904,879.

Specification of Letters Patent.

Patented Nov. 24, 1908.

Application filed April 19, 1907. Serial No. 369,105.

To all whom it may concern:

Be it known that I, GEORG KIRKEGAARD, a citizen of the United States, and a resident of the city of New York, in the county of New York and State of New York, United States of America, have invented certain new and useful Improvements in Automatic-Feed Capping-Machines of which the following is a specification.

10 My invention relates to an automatic feed capping machine for applying caps to bottles and its object is to provide a simple apparatus for applying bottle stoppers or caps to bottles and locking them thereto.

15 I will describe my invention in the following specification and point out the novel features thereof in claims.

Figure 1 is a side elevation of a bottle capping machine made according to my invention. Fig. 2 is a perspective view of a bottle stopper or cap which I have invented and in conjunction with which the present invention may be used to advantage. Fig. 3 is a side elevation of a portion of my improved apparatus showing a part of the automatic feed mechanism which I have invented. Fig. 4 is a plan view of the automatic feed mechanism. Fig. 5 is a front elevation of a portion of my machine showing a pair of collars and cams which I use to actuate a feed arm. Fig. 6 is a sectional side elevation of the feed mechanism. This view is similar to that shown in Fig. 3, but in this case the parts are shown in different relative positions. Fig. 7 is a plan view of the parts shown in Fig. 6, the section being taken through the line 7—7 in Fig. 6.

Like characters of reference designate corresponding parts in all of the figures.

40 10 designates a standard or frame upon which the various parts of my apparatus are mounted. This frame comprises a base 11 in which a treadle 12 is pivoted at 13. A tension spring 14 is attached to the frame and to this treadle to raise and to normally maintain the treadle and its connected parts in their raised position.

50 15 designates a vertically slidable rod which is supported by the frame 10 at 16 and also by the bracket 17 which is rigidly attached to the frame. The rod 15 is connected with the treadle 12 by means of a pitman 18. A collar 15^A is attached to the rod 15 near its upper end.

55 19 and 20 designate two arms which ex-

tend horizontally from the frame 10 and which may be constructed, as shown, to be integral parts thereof. These two extending arms are arranged to slidably support a reciprocating shaft 21 which is associated 60 with the rod 15 by means of a yoke 22 which fits loosely over the latter. The shaft 21 is affixed to the outer end of the yoke 22 at 23 and is normally maintained in a raised position by means of a compression spring 65 24 which surrounds the rod 15 and is placed between the lower portion of the yoke and the upper portion of the frame 10. The lower end of the shaft 21 is provided with a flange 25 which limits the upward move- 70 ment of the shaft by striking against the outer end of the extending arm 20. The outer edge of this flange 25 is threaded and a collar 26 is attached thereto. This collar is provided at its lower end with an in- 75 wardly projecting lip 27.

30 designates a forming ring or die which is provided with internal surfaces 31 which are arranged to engage with portions of a bottle stopper or cap. This forming ring 80 may be made up of a plurality of sectors held together and in horizontal alinement by means of springs 32, 32 which are set into grooves in the external surfaces of the sectors. This forming ring is preferably of a 85 vertical length somewhat less than the distance between the bottom of the flange 25 and the top of the projecting lip 27. As it is held in place between these parts it is therefore loosely held thereby, and a pin 33 in one of 90 its sectors and extending into a hole in the flange 25 may be provided to hold the forming ring from rotation.

The lower part of the shaft 21 is bored out for the reception of a secondary or compression shaft 34 which is vertically movable 95 within the shaft 21 and extends down through the forming ring 30. A pin 35 fixed in the compression shaft 34 passes through the vertical slots 21^A in the sides of the shaft 21 and 100 limits the downward movement of the compression shaft 34 within the shaft 21. The compression spring 36 is placed within the hollow portion of the shaft 21 above the compression shaft 34 to press the latter outward. 105 The compression shaft 34 may be magnetized or a permanent magnet 37 may be inserted within its lower end.

40 is a bracket permanently affixed to the frame 10 and extending around the rod 15 110

to a point directly in front of the latter, where, at 41, it pivotally supports the inner member 42 of a swinging feed arm thus providing means for the latter to move horizontally. The member 42 is rigidly attached to the pivot 41 as is also an actuating lever 43 which carries at its outer end an antifriction roller 44. The outer member 45 of the feed arm is pivoted at 46 to its inner member 42. The outer end of this arm 45 forms a cap-carrying head 47 which may be cut out as is shown at 47^A for the reception of certain parts of the cap. A cam lever 48 extends downward from the rear portion of the arm 45, and a stop lug 49 for limiting the downward position of the arm 45 may be made integral therewith and arranged to engage with the underside of the inner member 42. A spring 46^A may be provided and arranged to press the cap-carrying head downward.

A collar 50 is affixed to the rod 15 at a point opposite the bracket 40 and this collar is provided with a projecting cam surface 51 which is arranged to coact with the actuating lever 43. A spring 41^A is arranged to keep the antifriction roller 44 against this cam surface 51.

Directly below the collar 50 another collar 52 is affixed to the shaft 15 and this lower collar is provided with a projecting arm 53 which is arranged to engage with the arm 48 in the manner which will be pointed out later.

60 designates a bottle stopper which I have invented and for which Letters Patent Number 829,341 were issued to me August 21, 1906. This cap comprises a disk 61 of magnetic material such, for example, as commercial tin plate, having a depending flange 62 below which are projecting fingers 63, 63. A lining of compressible material 64 such as cork is placed against the disk within the flange.

A chute 70 may be attached to the frame 10 as at 71 and this chute may be inclined sufficiently to allow the caps 60, when placed within it either by hand or from a hopper, to slide down to its lower end. Grooves 72 are provided in the surface of this chute for allowing clearance for the depending fingers 63, 63 of the caps. At the lower end of the chute an opening 73 is provided. An escapement lever 74 is pivoted at the side of the chute near its lower end at 75, and its trip lever 76 is extended into the path of movement of a pin 45^A upon the feed arm 45.

A bottle stand 80 is supported in the outer end of the bracket 17. By means of a spindle 81 and an adjusting nut 82 the vertical height of this bottle stand may be varied. 83 is a bottle having a bead or shoulder 84 about the upper portion of its neck. The stand 80 is provided for the purpose of supporting such a bottle under the compression shaft 34 and in vertical alinement with the latter.

The operation of this device is as follows: When the apparatus is at rest the various parts assume positions such as are shown in Fig. 1. The first movement of the treadle 12 will cause the vertical rod 15 and its associated parts to be depressed. The first effect of this operation will be to remove the projecting arm 53 away from the depending portion 48 of the feed arm 45 and to allow the latter to drop down into the position in which it is shown in Fig. 3. The next effect of the operation will be to cause the antifriction roller 44 to ride up upon the cam surface 51 and to thus swing the feed arm horizontally about the pivot 41. This will cause the cap-carrying head 47 at the end of the feed arm to be moved into a position directly under the opening 73 at the end of the chute 70. At the same time the pin 45^A striking against the trip lever 76 of the escapement will cause the latter to be moved and to allow one of the caps 60 to drop through the opening 73 into the cap-carrying head 47.

The downward movement of the shaft 15 just described will bring the collar 15^A down to the upper portion of the yoke 22. While the parts are in the above positions an operator may place the bottle 83 upon the bottle stand 80, after which he may further depress the treadle 12. This further depression of the treadle will cause the reciprocating shaft 21 and the compression shaft 34 to be moved downward against the action of the spring 24. A cap 60 has been placed upon the lower end of compression shaft 34 in a manner which will be pointed out later. The downward movement of the reciprocating shaft 21 and the compression shaft 34 will continue until the bottle cap is placed upon the top of the bottle 83, and as the reciprocating shaft 21 is continued in its downward movement the cap will be firmly pressed down upon the bottle under the action of the compression spring 36, thus compressing the lining 64. It may be seen that although the movement of the compression shaft 34 is arrested by the cap coming in contact with the bottle the reciprocating shaft 21 and the other parts which are associated therewith may continue their downward movement. This downward movement will cause the cam grooves 31 of the forming ring 30 to act upon the depending fingers 63 of the bottle cap and to press them inward and under the bead or shoulder 84 around the neck of the bottle. The bottle will thus be sealed and the operator may then allow the various parts to return to their original position by allowing the springs 24 and 14 to raise the rod 15 and its connected parts. The first effect of this will be to raise the forming ring 30 and the compression shaft 34 above the bottle, and the latter may then be removed. The next ef-

fect of the upward movement of the rod 15 will be to move the portion of the cam surface 51 which pressed against the cam lever 43 in such a manner as to allow the spring 41^A to return the cam lever 48 and the feed arm 45 to their original positions in alignment with the compression shaft 34 and in the position in which it is shown in Fig. 3.

As the rod 15 continues its upward movement the arm 53 will come in contact with the depending arm 48 and push the latter outward, thereby raising the feed arm 45 and its cap-carrying head 47. One of the caps 60 is now in this cap-carrying head and as the latter is raised up against the compression shaft 34, the cap will be brought in contact with the compression shaft, and because the latter is magnetized or is provided with a permanent magnet 37, the cap will remain upon the compression shaft during the subsequent parts of the operation which have already been described.

The above operations may be repeated indefinitely and the caps applied to bottles rapidly because the apparatus is provided with the means above described for automatically placing upon the end of the compression shaft 34 one of the caps 60 during each cycle of operations.

What I claim is—

1. In a bottle capping machine, a cap-applying head, means for reciprocating said head, and a feed arm having a swinging movement about separate horizontal and vertical axes for supplying caps to said head.

2. In a bottle capping machine, a cap-applying head, means for reciprocating said head, said means having a pair of cam surfaces fixed thereto, and a feed arm having a swinging movement in a horizontal and in a vertical plane and having extensions in the path of said respective cam surfaces.

3. In a bottle capping machine adapted to apply caps having prongs to bottles, a cap-applying head, means for reciprocating said head, a chute having longitudinally extending grooves in its bottom surface to receive said prongs, and a feed arm having peripheral notches for said prongs.

4. In a bottle capping machine, a cap-applying head, means for reciprocating said head, and a feed arm swinging on a vertical axis and having an extension in the path of said means, said feed arm having a jointed extremity tiltable on a horizontal axis and having another extension in the path of said means.

5. In a bottle capping machine, a cap-applying head, means for reciprocating said head, a feed arm, and a chute having an escapement device in the path of said arm and operated thereby and adapted to deliver caps thereto.

6. In a bottle capping machine, a cap-applying-head arranged to be moved vertically, a reciprocating rod, a feed arm arranged to have a horizontal and a vertical movement, cam surfaces carried by the reciprocating rod, said cam surfaces arranged to control the movement of the feed arm, and a lost motion connection between the reciprocating rod and the cap-applying-head.

7. In a bottle capping machine, a cap-applying-head arranged to be moved vertically, a reciprocating rod, a feed arm arranged to have a horizontal and a vertical movement, means for supplying caps to said feed arm, a cam carried by the reciprocating rod arranged to control the horizontal movement of the feed arm, a second cam carried by said rod arranged to control the vertical movement of the arm, and a lost motion connection between the reciprocating rod and the cap-applying-head.

8. In a bottle capping machine, a cap-applying-head, comprising a compression shaft; a reciprocating rod, a cap-supplying chute, a feed arm arranged to be moved horizontally between the chute and the cap-applying-head, a cam carried by the reciprocating rod for controlling said horizontal movement of the feed arm, a second cam carried by said rod arranged to move the feed arm vertically into and out of engagement with the compression shaft, and a lost motion connection between the reciprocating rod and the cap-applying-head arranged to impart vertical movements to said head relative in time to the movements of the feed arm.

9. In a bottle capping machine, a cap-applying-head comprising a magnetized compression shaft; a reciprocating rod, a cap-supplying chute, a feed arm arranged to be moved horizontally between the chute and the cap-applying-head, a cam on the reciprocating rod for controlling said horizontal movement of the feed-arm, means for supplying a cap to the feed arm when the arm is moved under the chute, a second cam carried by the reciprocating rod and arranged to move the feed arm upward until the cap which it carries is brought into contact with the magnetized compression shaft, and a lost motion connection between the reciprocating rod and the cap-applying-head, arranged to impart vertical movements to said head relative in time to the movements of the feed arm.

10. In a bottle capping machine, a cap-applying-head comprising a magnetized compression shaft, a reciprocating rod, a cap-supplying chute, a feed arm pivoted to move horizontally and vertically, a cap-carrying head upon the feed arm, the horizontal movement of the feed arm being arranged to move the cap-carrying-head between the chute and the cap-applying-head, a cam carried by the reciprocating rod for controlling

11. In a bottle capping machine, a cap-applying-head arranged to be moved vertically, a reciprocating rod, a feed arm arranged to have a horizontal and a vertical movement, cam surfaces carried by the reciprocating rod, said cam surfaces arranged to control the movement of the feed arm, and a lost motion connection between the reciprocating rod and the cap-applying-head.

said horizontal movement, an escapement device actuated by the movement of the feed arm for supplying a cap to the cap-carrying-head when said cap-carrying-head is moved
 5 under the chute, a second cam carried by said reciprocating rod and arranged to move the feed arm upward until the cap which it carries is brought into contact with the magnetized compression shaft, and a lost
 10 motion connection between the reciprocating rod and the cap-applying-head arranged to impart vertical movements to said head relative in time to the movements of the feed arm.

11. In a bottle capping machine, a cap-applying-head comprising a forming ring and a compression shaft movable relatively to the forming ring; said cap-applying-head being
 20 arranged to be moved vertically, a reciprocating rod, a feed arm arranged to have a horizontal and a vertical movement, means for supplying caps to said feed arm, a cam carried by the reciprocating rod arranged to control the horizontal movement of the
 25 feed arm, a second cam carried by said rod arranged to control the vertical movement of the feed arm, and a lost motion connection between the reciprocating rod and the cap-applying-head arranged to cause the
 30 movement of the reciprocating rod to press the cap upon a bottle and to lock it thereto.

12. In a bottle capping machine, a cap-applying-head comprising a forming ring, a compression shaft movable relative to the
 35 forming ring, and a resilient connection between the forming ring and the compression shaft; a reciprocating rod, a cap-supplying chute, a feed arm arranged to be moved horizontally between the chute and the cap-
 40 applying-head, a cam carried by the reciprocating rod for controlling said horizontal movement of the feed arm, a second cam carried by said rod arranged to move the feed arm vertically into and out of engagement
 45 with the compression shaft, and a lost motion connection between the reciprocating rod and the cap-applying head arranged to impart vertical movements to said head relative in time to the movements of the feed
 50 arm, and to cause the compression shaft to press the cap upon a bottle and a forming ring to lock it thereto.

13. In a bottle capping machine, a cap-applying-head comprising a reciprocating
 55 shaft, a forming ring loosely connected therewith, a magnetized compression shaft movable relatively to the forming ring, and a spring connection between the reciprocating shaft and the compression shaft; a reciprocating
 60 rod, a cap-supplying chute, a feed arm

arranged to be moved horizontally between the chute and the cap-applying-head, a cam on the reciprocating rod for controlling said horizontal movement of the feed arm, means
 for supplying a cap to the feed arm when
 65 the arm is moved under the chute, a second cam carried by the reciprocating rod and arranged to move the feed arm upward until the cap which it carries is brought into contact with the magnetized compression shaft,
 70 and a lost motion connection between the reciprocating rod and the reciprocating shaft arranged to impart vertical movements to said rod relative in time to the movements of the feed arm and to cause the compression
 75 shaft to press the cap upon a bottle and a forming ring to lock it thereto.

14. In a bottle capping machine, a frame, a vertically reciprocating rod supported therein, means for actuating said rod, a cap-
 80 applying-head comprising a reciprocating shaft, a forming ring built up of a plurality of sectors, said forming ring being loosely held upon the reciprocating shaft, a magnetized compression shaft within the reciprocating shaft and the forming ring and
 85 movable relative thereto; a cap-supplying chute, a feed arm pivoted to move horizontally and vertically, a cap-carrying-head upon the feed arm, the vertical movement of
 90 the feed arm being arranged to move the cap-carrying-head between the chute and the cap-applying-head, a cam carried by the reciprocating rod for controlling said horizontal movement, an escapement device actuated
 95 by the movement of the feed arm for supplying a cap to the cap-carrying-head when the cap-carrying-head is moved under the chute, a second cam carried by said reciprocating rod and arranged to move the
 100 feed arm upward until the cap which it carries is brought into contact with the magnetized compression shaft; a yoke attached to the reciprocating shaft and associated with the reciprocating rod and forming a
 105 lost motion connection between the shaft and said rod, said connection being arranged to impart vertical movements to said reciprocating shaft relative in time to the movements of the feed arm and arranged to
 110 cause the compression shaft to press the cap upon a bottle and the forming ring to lock it thereto.

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

GEORG KIRKEGAARD.

Witnesses:

ERNEST W. MARSHALL,
 ELLA TUCH.