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H. L. FOWLER ET AL.

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BOXING FOR CEMENTITIOUS MOLDS

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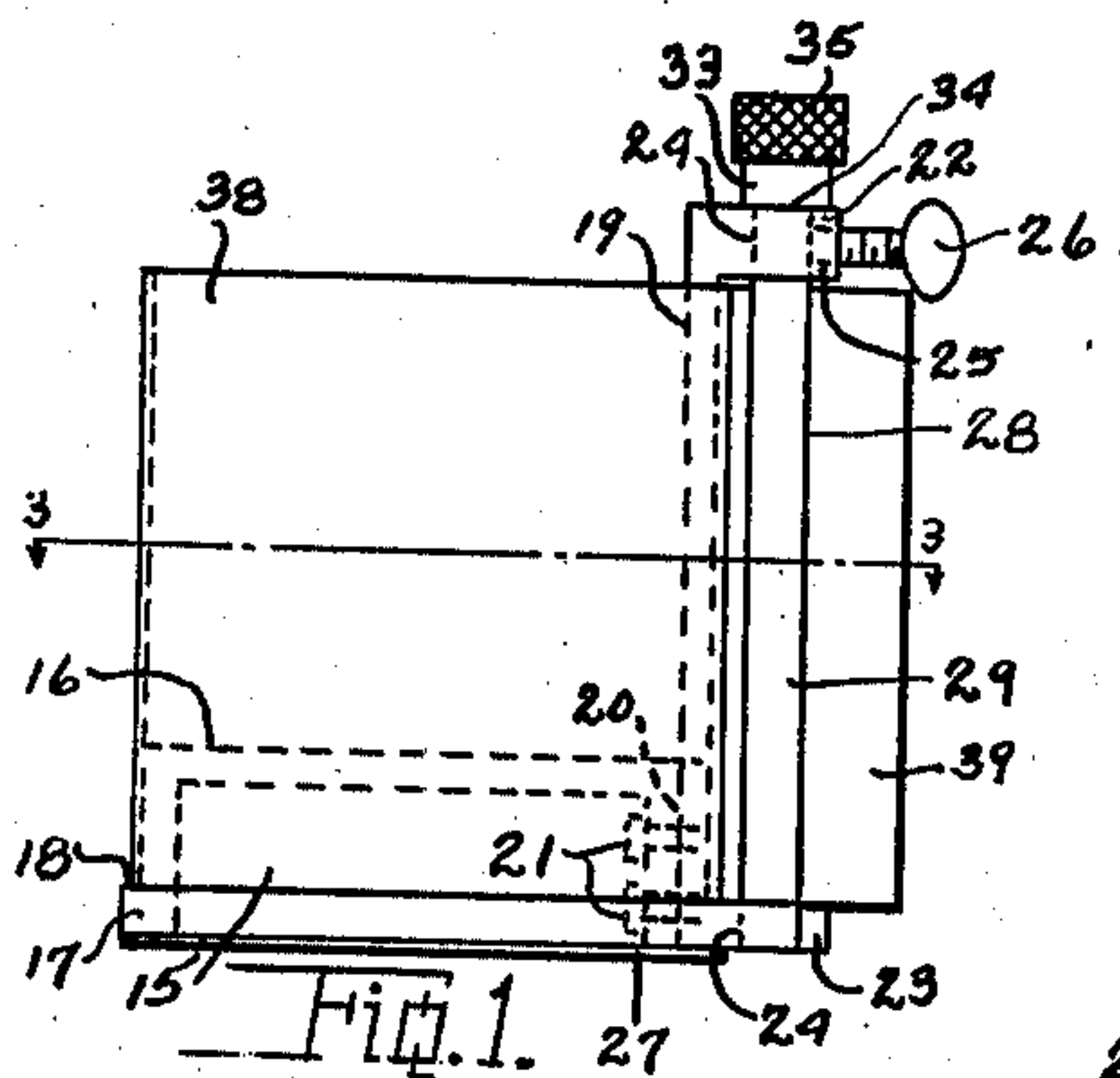


Fig. 1.

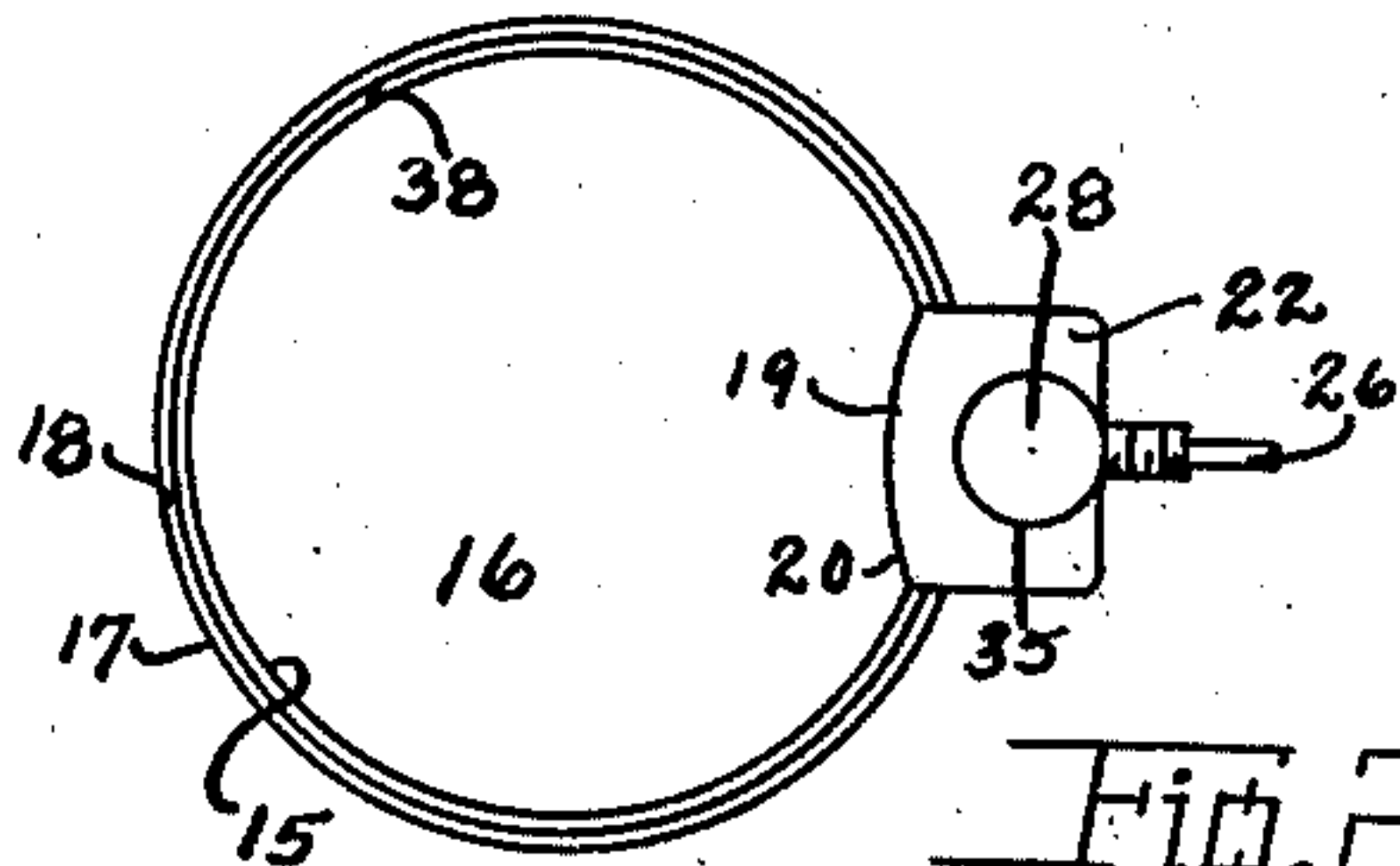


Fig. 2.

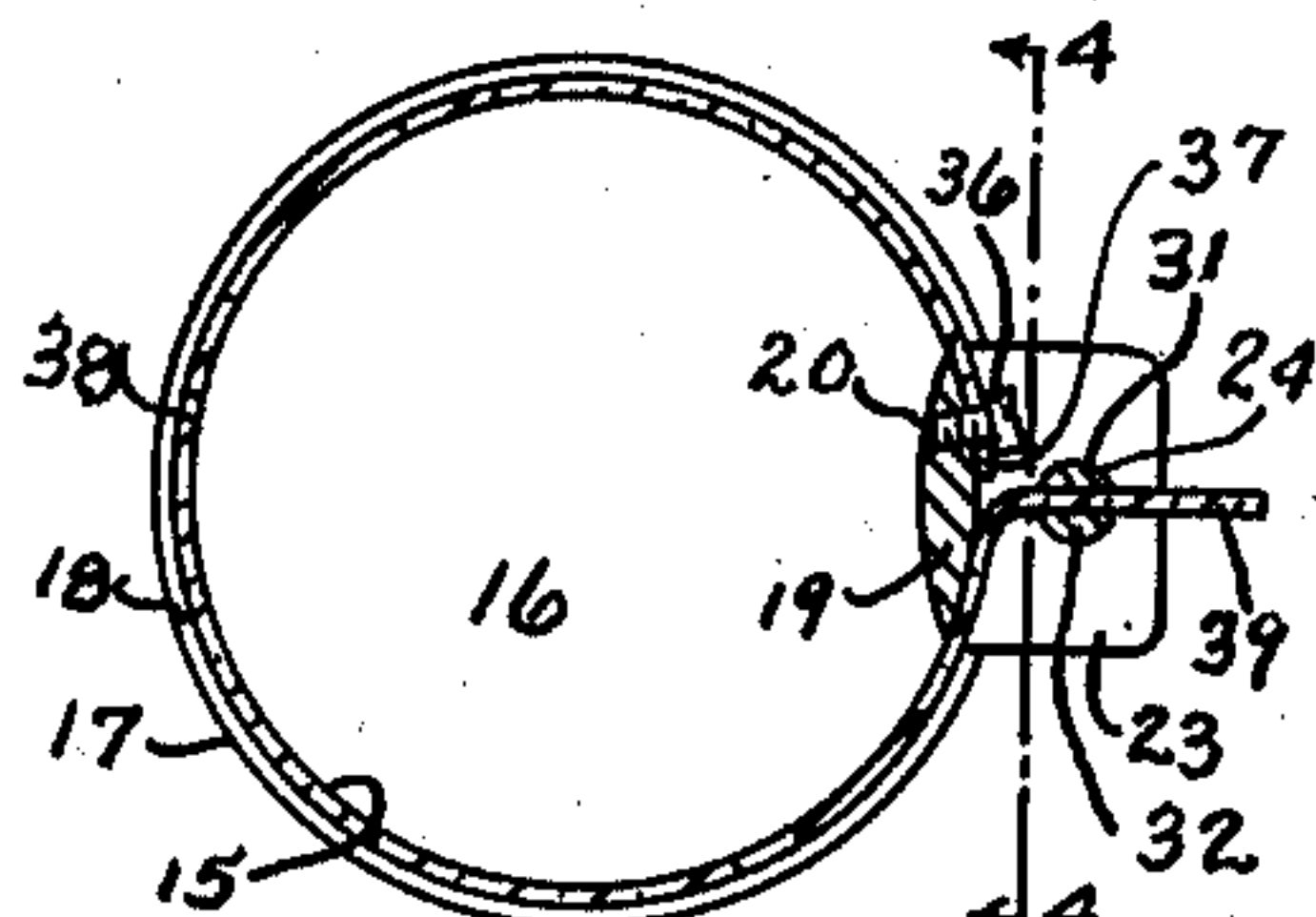


Fig. 3.

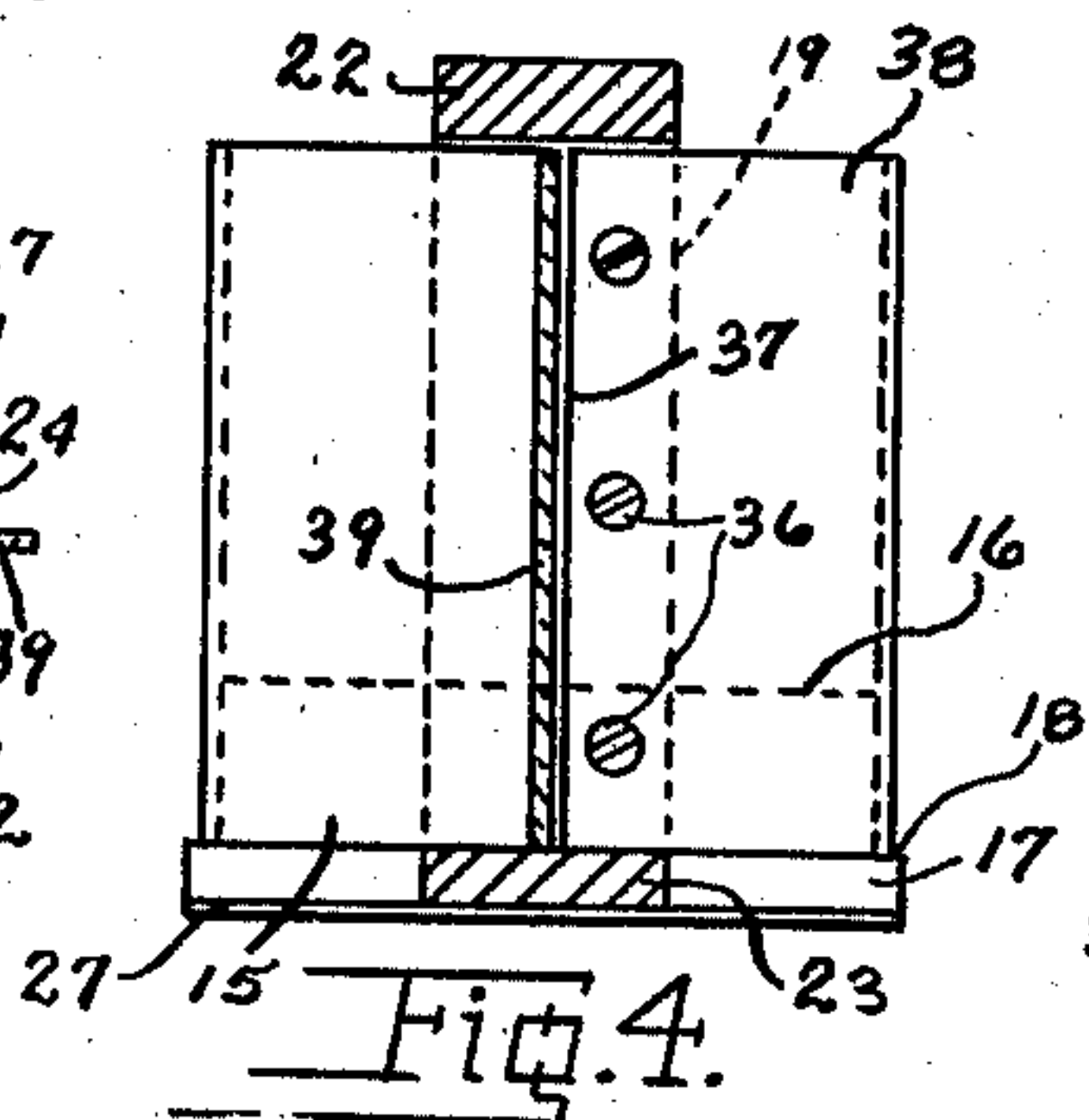


Fig. 4.

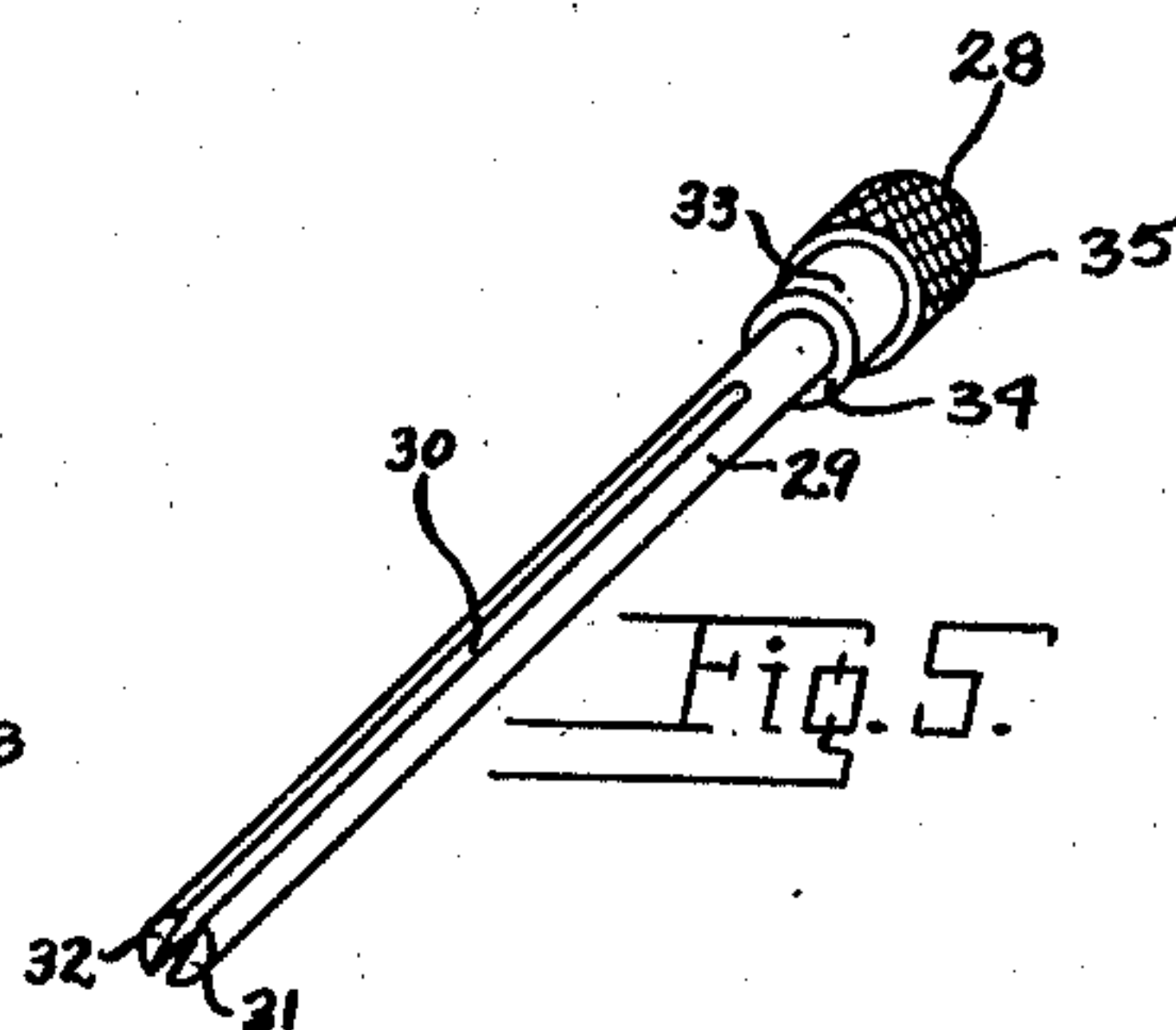


Fig. 5.

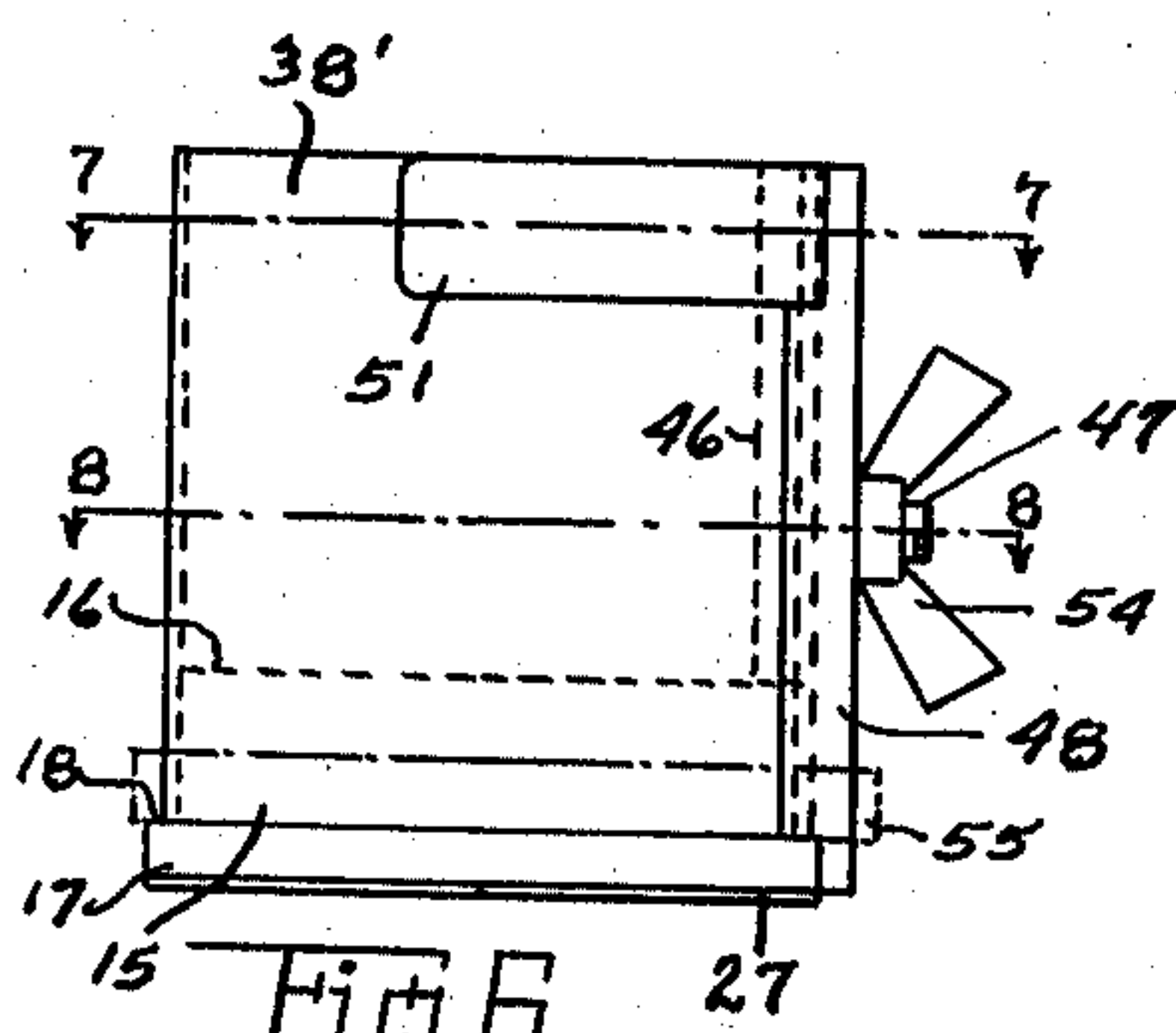


Fig. 6.

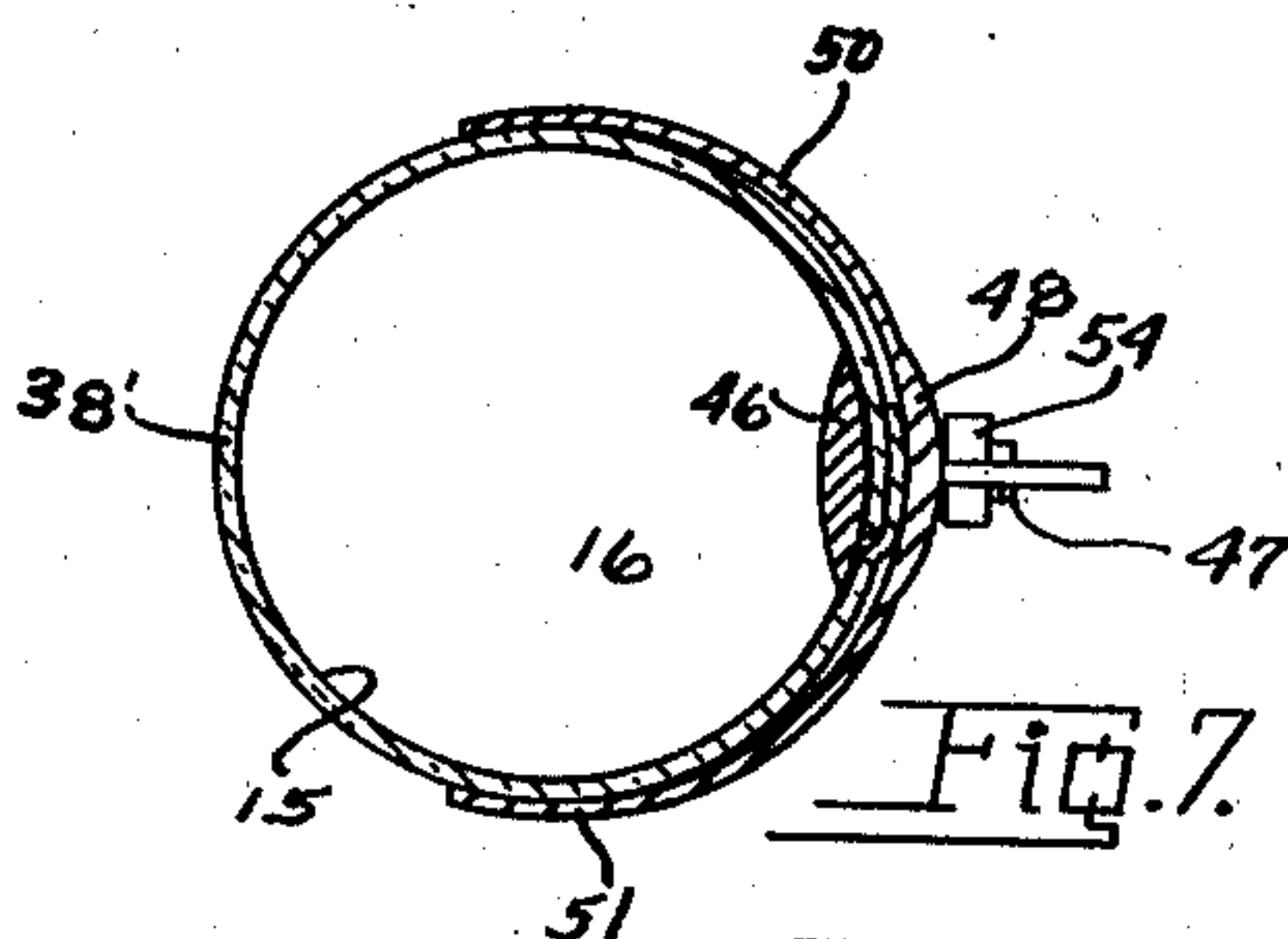


Fig. 7.

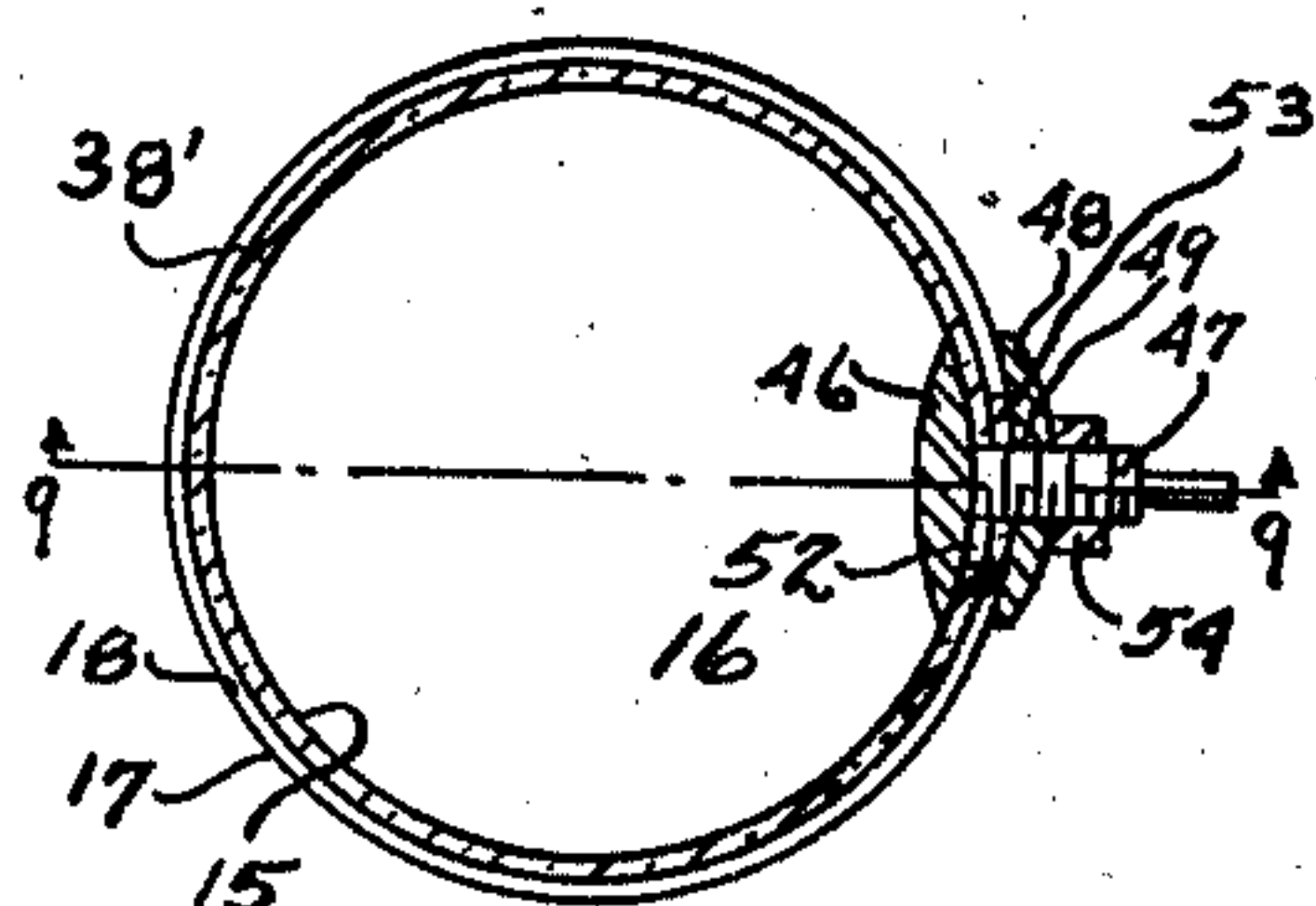


Fig. 8.

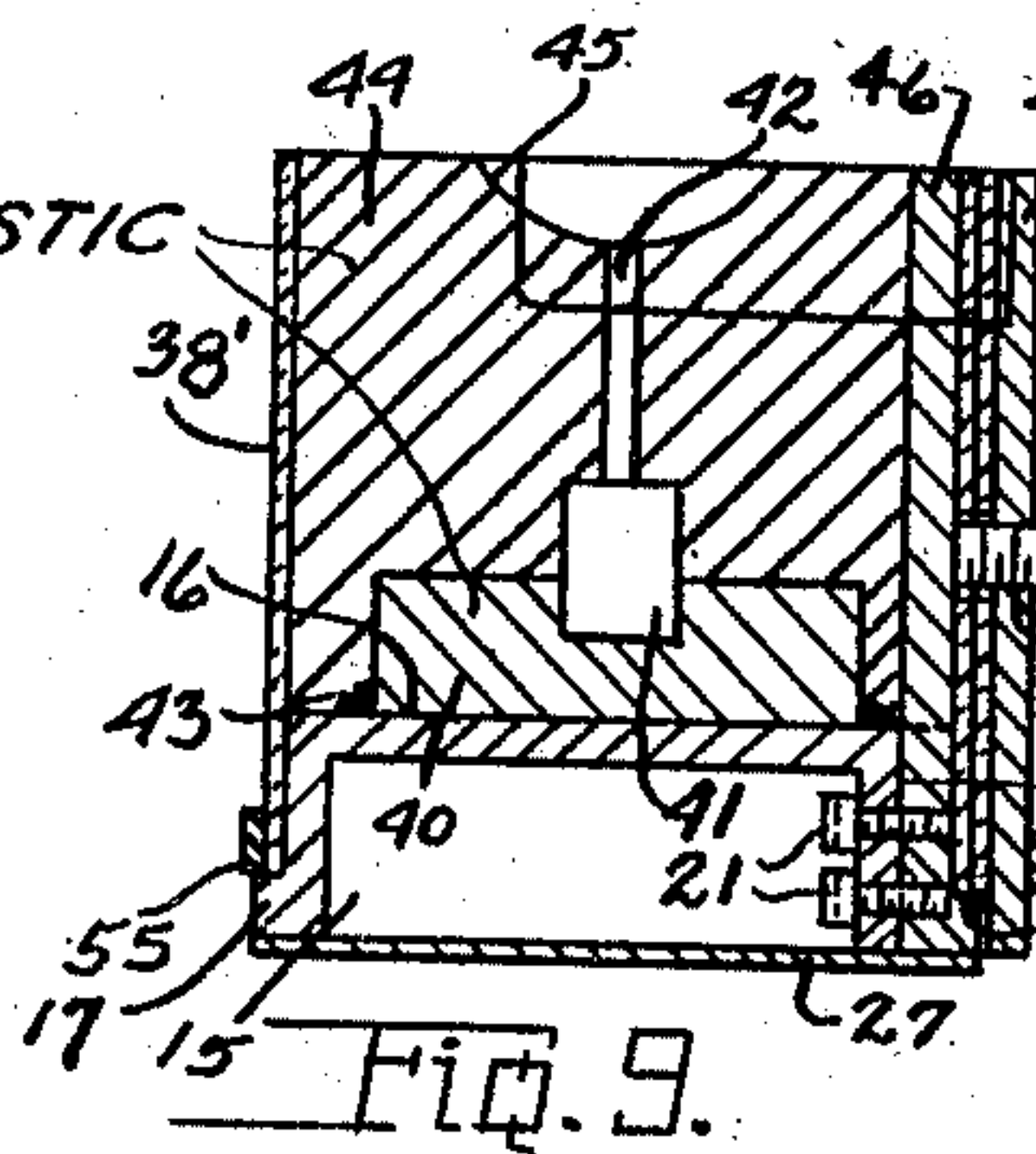


Fig. 9.

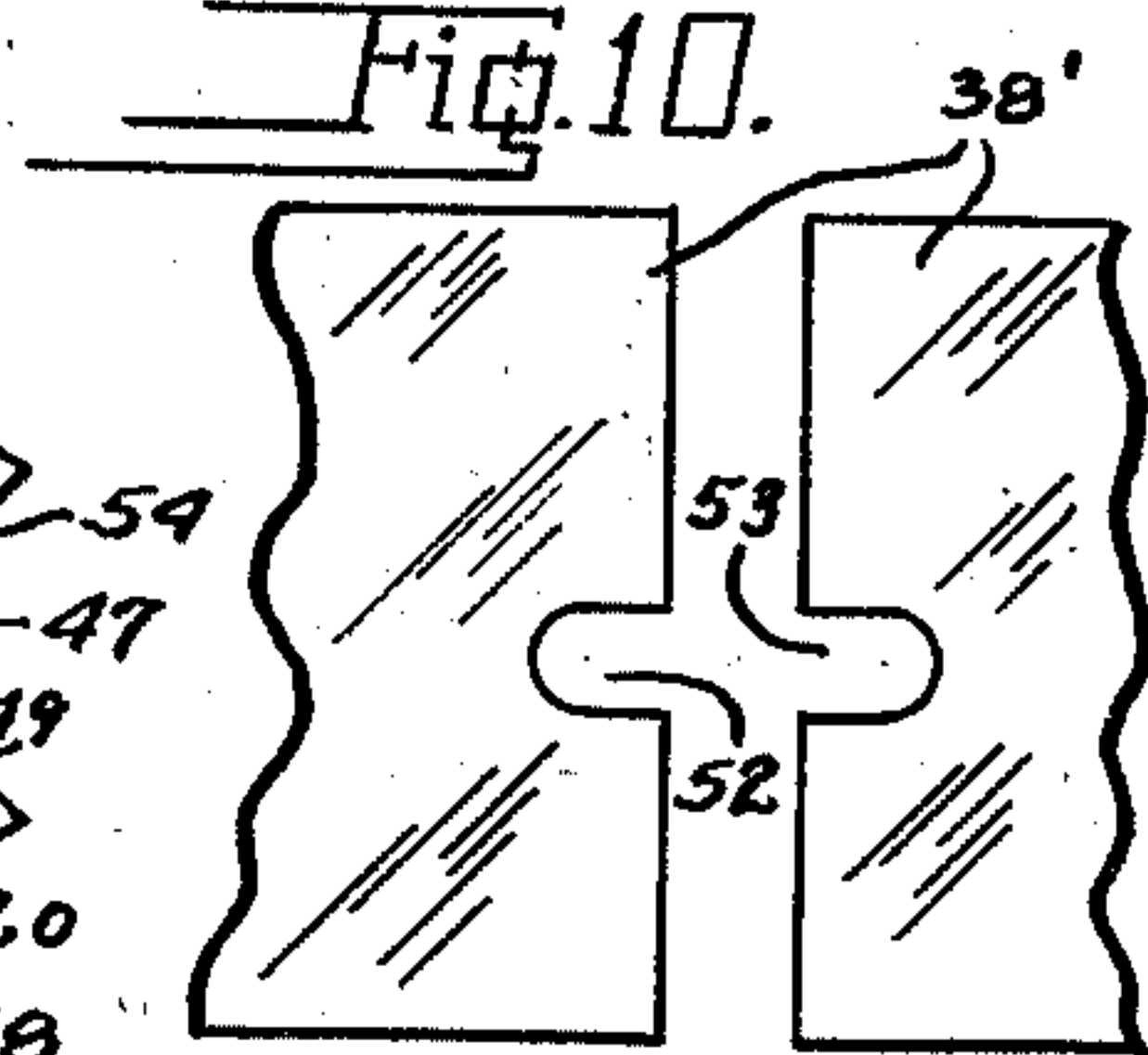


Fig. 10.

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BOXING FOR CEMENTITIOUS MOLDS

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10 Claims. (Cl. 22—97)

This invention relates to means for holding a cementitious mass of investment material while the same is setting and hardening around a wax pattern or model which wax pattern or model is subsequently evaporated and a metallic cast thereof made and which means or mechanism may be termed a boxing for cementitious molds.

The boxing for cementitious molds herein described will probably find its primary use in the making of molds for dental castings and its use will be described in this connection. In the past it has been customary to make the boxing of sheet wax which required considerable amount of patient work and resulted in the destruction of the wax and thereby increased the cost of the mold. Frequently the castings to be made have undercut sections or portions and other extremely thin sections and with the boxing as previously used no assurance was had that the investing mold material was properly surrounding and contacting these parts.

By the present invention there is provided a boxing which can be repeatedly employed for forming the mold and readily adapts itself to the use of flexible transparent material whereby the operator can readily see where his investing mold material is going and has the assurance that his resulting casting will have all of the proper undercuts and this section portions thereon.

It is therefore one of the chief objects of this invention to provide a boxing for forming cementitious molds that may be readily set up preparatory to use.

Another object of this invention is the provision of a boxing for cementitious molds that can be used over and over again and reducing to a minimum the time involved in making a cementitious mold.

Another object of this invention is the provision of a mechanism for accomplishing the objects above and in which use may be readily made of transparent material for forming the walls of the boxing so that the operator can readily see the flow of the cementitious mass around the pattern or mold during and while it is being invested.

It is also an object of this invention to provide such a boxing which comprises a minimum number of parts and all of which have relative plane or flat surfaces for cleaning purposes and yet when set up is substantially water tight at the joints to prevent the loss of the cementitious investing material poured into said box when in a relatively fluid state.

Other objects and advantages of the present invention should be readily apparent by reference to the following specification considered in conjunction with the accompanying drawing forming a part thereof and it is to be understood

that any modification may be made in the exact structural details there shown and described, within the scope of the appended claims, without departing from or exceeding the spirit of the invention.

In the drawing:

Fig. 1 is an elevational view of one form of the boxing forming the subject matter of this invention.

Fig. 2 is a top plan view of the boxing of Fig. 1.

Fig. 3 is a substantially central horizontal sectional view taken on line 3—3 on Fig. 1.

Fig. 4 is a view partly in section and partly in elevation as seen substantially from line 4—4 on Fig. 3.

Fig. 5 is a prospective view of the key for tightening the "curtain" which forms the wall of the box.

Fig. 6 is a view, similar to Fig. 1, of a second form of boxing forming the subject matter of this invention.

Figs. 7 and 8 are horizontal sectional views through the modified boxing of Fig. 6 and as seen respectively on line 7—7 and 8—8 on said Fig. 6.

Fig. 9 for a vertical sectional view through the modified boxing as seen on line 9—9 on Fig. 8.

Fig. 10 is an elevational view of the opposite ends of the "curtain" forming the sides of the modified boxing of Fig. 6.

Throughout the several views of the drawing similar reference characters are employed to denote the same or similar parts.

As was noted above the mechanism of this invention may be termed a boxing for cementitious molds that is a structure which holds the cementitious material while setting or hardening from its initial semi-fluid state to its set form and at the same time supports the pattern or model around which the cementitious material is poured. As will later be made clear this boxing is supported on a vibrator so that the mold material which is poured into the boxing flows into all of the crevices and undercuts on the pattern.

Specifically, and referring to the drawing, the boxing of this invention comprises a base member 15 conveniently formed of a metal casting and hollowed for lightness. The upper end of the base is flat as at 16 and the lower end has a projecting rib 17 to form a shoulder 18 and upstanding from said base is a post 19. The post 19 may be integral with the base 15 but for convenience in manufacture is formed separately from the base and let into a socket 20 in the base and held therein by suitable screws 21.

As seen in Figs. 1 to 4 inclusive, the post 19 has outwardly projecting from its upper and lower ends, respectively, an ear 22 and 23 each provided with an aperture 24 in alignment with

one another. The ear 22 is provided at right angles to its aperture 24 with a tapped aperture 25 receiving the threaded end of a thumb screw 26. In order to finish off the base 15 its lower open end is closed by a base plate 27 pinned or otherwise secured to the flange of the said base 15.

Passing through the aligned apertures 24 in the ears 22 and 23 is a key indicated in general by the reference character 28 and illustrated most clearly in Fig. 5. The key 28 comprises a relatively long circular body portion 29 having substantially throughout its length a slit or slot 30 thereby providing arms 31 and 32. At the upper end of the body portion 29 is a collar 33 having a shoulder 34 at its lower end which rests on the upper surface of the ear 22 and thereby limits the movement of the key 28 through the ears 22 and 23. Beyond the collar portion 33 is a knob 35 serrated for the operator's convenience in readily turning the key 28 in its apertures 24.

Secured to the back surface of the post 19 as by screws 36, is one end 37 of, what may be termed for want of a better name, a curtain 38, which forms the walls of the boxing. The curtain 38 is formed of sheet material which can be readily bent around the base 15 and drawn tightly thereagainst and has its lower edge resting on the shoulder or ledge 18 formed by the annular rib 17. It is preferable that this curtain be transparent and non-porous with its inner and outer surfaces smooth. In practice it has been found that sheet Celluloid makes an ideal material for this purpose since it embodies all of the above characteristics. It is, of course, understood that other types of material having these same characteristics may be employed such as the newer thermo-plastic materials as used in a wide variety of instances. The other end 39 of the curtain 38 is not fastened except by the key 28 as will be later made clear.

The operation of the mechanism is as follows:

Reference is had to Fig. 9 which shows in broken lines the operation of this mechanism which is identical whether the boxing illustrated in Figs. 1 to 5 inclusive is employed or the boxing later to be described in detail and illustrated in Figs. 6 to 10 inclusive is employed.

Mounted on the surface 16 of the base 15 is the mold section 40 which has partly embedded therein or at least supported thereby the wax pattern or model 41 from which projects one or more sprue formers 42 which like the pattern 41 are formed of wax. The mold portion 40, which is made of cementitious material, is secured to the surface 16 by pieces of so called sticky wax 43. It will be understood that the mold 40 and parts associated therewith are positioned on the base 15 at its more advantageous position. After this has been done the walls of the boxing are arranged in position.

The curtain 38 is now wound around the base 15 with its lower edge on the shoulder or ledge 18 until its free edge 39 substantially meets the fixed edge 37 whereupon it is arranged outwardly as shown clearly in Fig. 3. The key 28 is then inserted through the aperture 24 in ear 22 in such a way as to have the projecting portion of the curtain 38 within its slot 30 and embraced by the key arms 31 and 32. The operator pushes the key downwardly until the lower end thereof is within the aperture 24 in ear 23 and the collar shoulder 34 resting on the upper surface of the ear 22 whereupon the key is turned in a clockwise direc-

tion as seen in Figs. 2 and 3 for drawing the curtain tightly around the base 15. The key is then locked in its tightened position by the thumb screw 26.

The assembly is now placed on a mechanical vibrator and the investment or cementitious material while in its fluid stage poured into the boxing to form the upper half or upper portion 44 of the mold. In other words the cementitious material forming the mold portion 44 is poured into the box to enclose the portion of the patterns 41 projecting from the mold portion 40 and to enclose the sprue formers 42. A hollow cup like depression 45 is now formed in the top surface of the mold portion 44 around the sprue formers and acts as the crucible in which the metal is subsequently reduced to a fluid state.

The entire mechanism is now set aside to allow the cementitious mold to set or harden as is the usual practice. It should be noted that since the curtain 38 is formed of transparent material the operator was observing the filling in of the plastic which formed the mold portion 44 and could readily control the flow of this material to be sure all crevices and undercuts were properly encased.

After the mold has set or hardened the thumb screw 26 is loosened to permit the renewal of the key 28 and thereby releases the free end of the curtain 39 whereupon said curtain is pulled from around the mold and the completed mold removed for operation thereon as is the usual practice.

In the modified mechanism disclosed in Figs. 6 to 10 inclusive a substantially identical base member 15 is employed and is secured thereto an upstanding post 46 which is shorter than the post 19 above and devoid of ears 22 and 23. The post 46 has projecting outwardly therefor substantially midway of its height a screw 47. Cooperating with the post 46 is a second post 48 of a length substantially equal to that of post 46 and having an aperture 49 through which projects the screw 47. Projecting from the upper end of the post 48, from each side thereof, is respectively an arm 50 and 51 arcuate shaped substantially to the diameter of the interior of the mold wall or curtain.

In this form of the invention the curtain 38' has both ends free of the post 46 and respectively provided with a notch 52 and 53 which when the curtain is in position receive the screw 47.

In the operation of this modified boxing construction the post 48 and the curtain 38' are removed entirely from the base 15 while the mold portion 40 and part carried thereby are being mounted and secured to said base. After this the curtain is arranged around the base 15 again with its lower edge on the shoulder 18 and with the notches 52 and 53 receiving the screw 47. The post 48 is then placed against the overlapped ends of the curtain 38' with the screw 47 projecting through the aperture 49 and the arms 50 and 51 encircling the upper end of the boxing sides. The thumb screw 54 is now screwed on to the screw 47 for clamping the posts 48 and 46 to one another with the curtain ends therebetween.

The further operation or filling of this box is identical with that above. The modified boxing mechanism through its arms 50 and 51 has the advantage of supporting the upper end of the boxing wall against outward sagging due to the weight of the cementitious material therein.

In order to insure a tight fit of the lower end of the curtain 38 against the base 15 use may

be made of an elastic band 55 placed around said lower end of the boxing wall and shown in phantom lines in Fig. 6 and solid lines in Fig. 9. This tight fit of the housing wall in the structure illustrated in Figs. 1 to 5 inclusive is, of course, obtained by a further tightening of the key 38.

What is claimed is:

1. In a mechanism of the class described the combination of a base member, a flexible transparent curtain having its lower edge encircling and tightly engaging the base member and upstanding therefrom to form a wall therearound, and means for securing the curtain in its encircled wall forming position.

2. In a mechanism of the class described the combination of a base member, a flexible transparent curtain having its lower edge encircling and tightly engaging the base member and upstanding therefrom to form a wall therearound, means for securing the curtain in its encircled wall forming position, and means upstanding from said base for ridgedly supporting a portion of the curtain in its upright position and constituting part of the curtain securing means.

3. In a mechanism of the class described the combination of a base member, a post upstanding from the base member at one point on its perimeter, a curtain removably having its lower edge encircling and tightly engaging the base member and upstanding to form walls around the perimeter of the base member, and means cooperating with said post for securing the curtain in its encircling position relative to the base member.

4. In a mechanism of the class described the combination of a base member, said base member having a radial shoulder projecting therefrom above the bottom of the base member, a post upstanding from said base member at one point on its perimeter, a transparent curtain having its lower edge resting on the shoulder and having its lower end encircling and tightly engaging the base member above the shoulder, and the curtain upstanding relative the base member to form walls thereabove with the curtain ends adjacent one another along the rear face of the post, and means cooperating with said post for securing the ends in adjacent position and relative to the base.

5. In a mechanism of the class described the combination of a base member, said base member having a radial shoulder projecting therefrom above the bottom of the base member, a post upstanding from said base member at one point on its perimeter, a transparent curtain having its lower edge resting on the shoulder and having its lower end encircling and tightly engaging the base member above the shoulder, and the curtain upstanding relative the base member to form walls thereabove with the curtain ends adjacent one another along the rear face of the post, means cooperating with said post for securing the ends in adjacent position and relative to the base, including a key rotatably supported by the post for drawing the ends of the curtain toward one another and securing them in this position.

6. In a mechanism of the class described the combination of a base member, said base member having a radial shoulder projecting therefrom above the bottom of the base member, a post upstanding from said base member at one point on its perimeter, a transparent curtain having its lower edge resting on the shoulder and having its lower end encircling and tightly engaging the base member above the shoulder, and the curtain upstanding relative the base member to form walls thereabove with the curtain ends adjacent

one another along the rear face of the post, and means cooperating with said post for securing the ends in adjacent position and relative to the base, including a second post adapted to overlap the first post with the ends of the curtain between them and secured in this position.

7. In a mechanism of the class described the combination of a base member, said base member having a radial shoulder projecting therefrom above the bottom of the base member, a post upstanding from said base member at one point on its perimeter, a transparent curtain having its lower edge resting on the shoulder and having its lower end encircling and tightly engaging the base member above the shoulder, and the curtain upstanding relative the base member to form walls thereabove with the curtain ends adjacent one another along the rear face of the post, means cooperating with said post for securing the ends in adjacent position and relative to the base, including a second post adapted to overlap the first post with the ends of the curtain between them and secured in this position, and arms extending from the second post substantially encircling the upper end of the curtain walls.

8. A boxing for cementitious molds comprising a base member having upstanding from one point on its periphery a post, said base having a shoulder projecting from its periphery above the bottom thereof, a curtain having one end secured to the post and encircling the base with its lower edge on the base shoulder and its free end adjacent its fixed end, arms projecting from the upper and lower ends of the post, a key journaled in said arms and having the body portion split to receive the free end of the curtain whereby rotation of the key tightens the curtain against the periphery of the base, and means for locking the key in its curtain tightening position.

9. A boxing for cementitious molds comprising a base member having upstanding from one point of its periphery a post, said base member having projecting from its periphery a shoulder, a curtain encircling the base member with its lower edge on the shoulder and its ends overlapped and against the back surface of the post, a screw projecting from the rear surface of the post through the overlapped ends of the curtain, a second post co-extensive in area with the first post and overlapping same with the overlapped ends of the curtain therebetween and a thumb nut on said screw for clamping the posts against one another and securing the ends of the curtain therebetween.

10. A boxing for cementitious molds comprising a base member having upstanding from one point of its periphery a post, said base member having projecting from its periphery a shoulder, a curtain encircling the base member with its lower edge on the shoulder and its ends overlapped and against the back surface of the post, a screw projecting from the rear surface of the post through the overlapped ends of the curtain, a second post co-extensive in area with the first post and overlapping same with the overlapped ends of the curtain therebetween, a thumb nut on said screw for clamping the posts against one another and securing the ends of the curtain therebetween, and arms projecting from the upper end of said second post for encircling the upper end of the curtain when in encircling position on the base.

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