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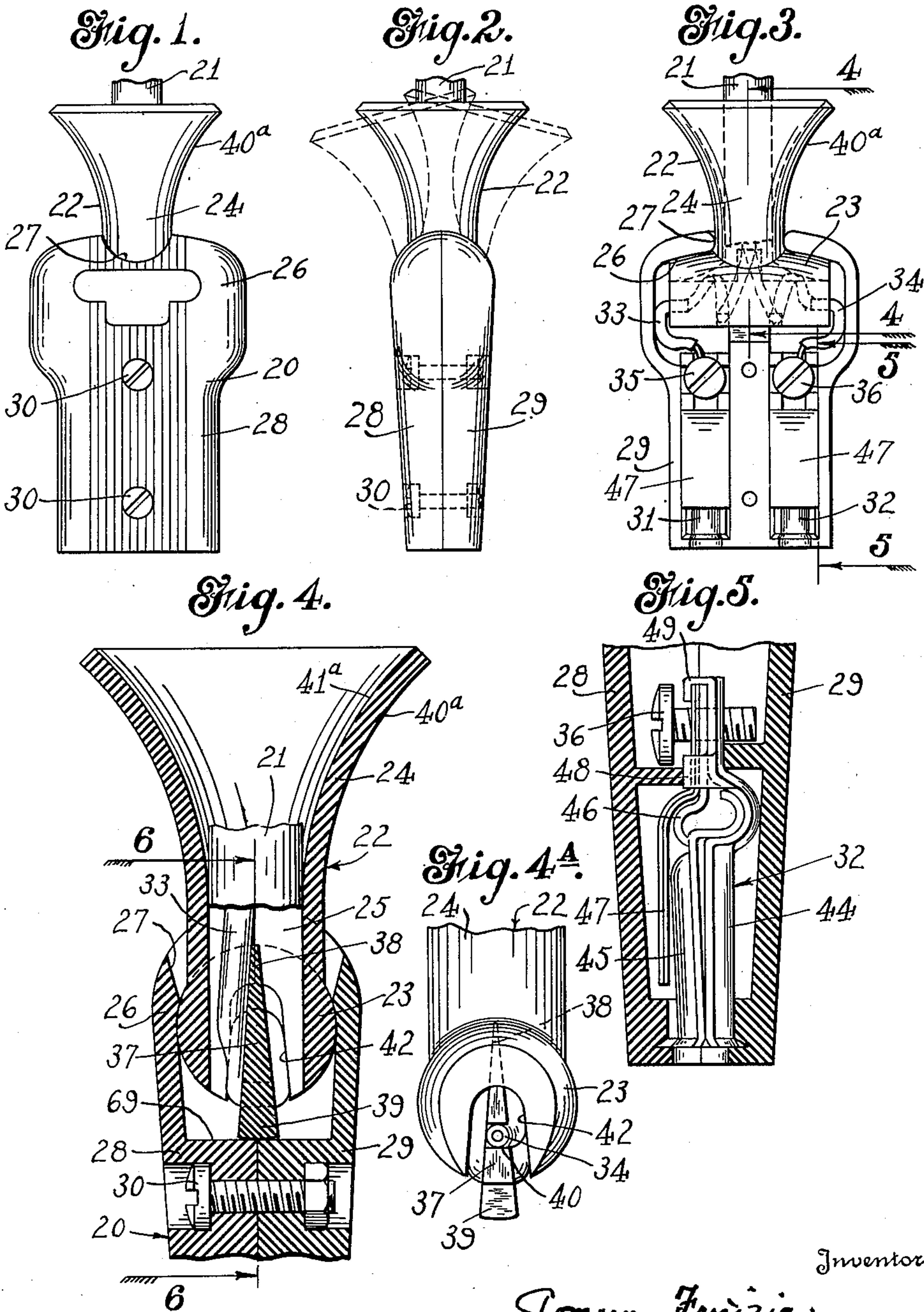
T. FINIZIE

2,540,575

CORD GUIDE MEMBER FOR UTENSIL PLUGS

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2 Sheets-Sheet 1



Inventor

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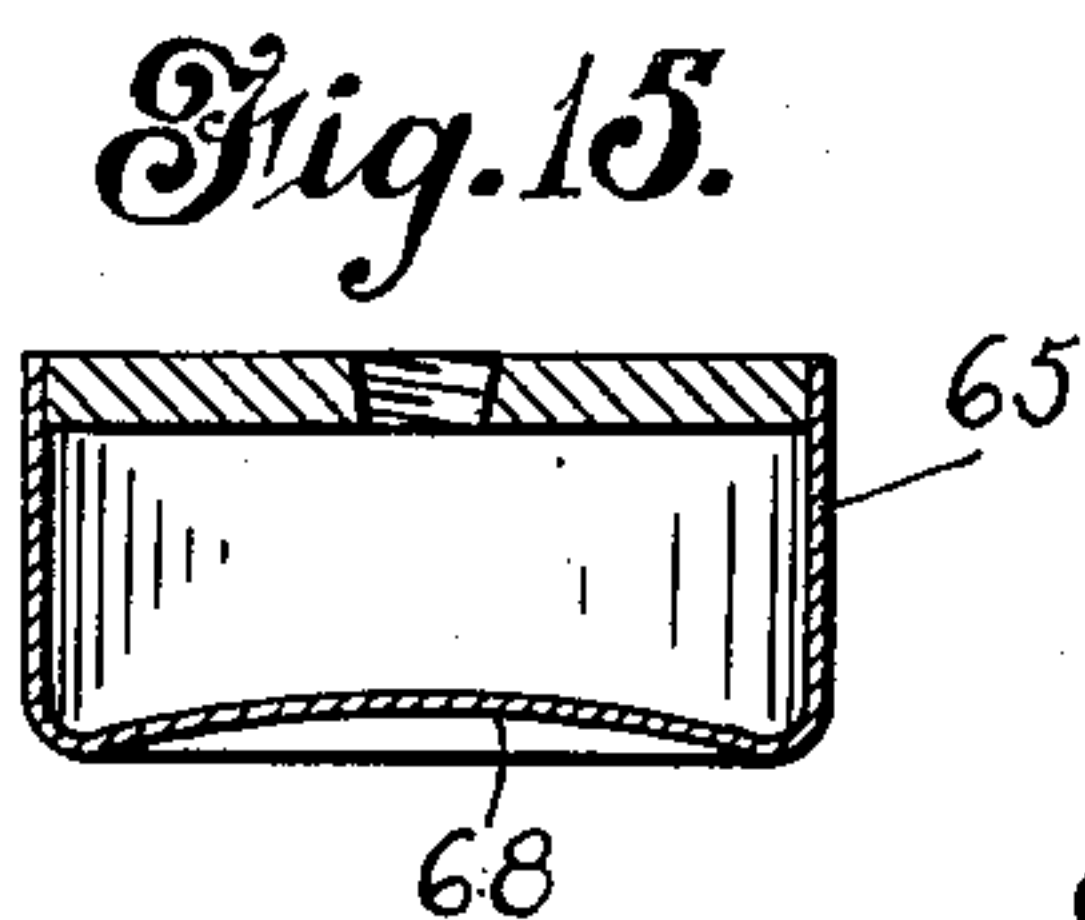
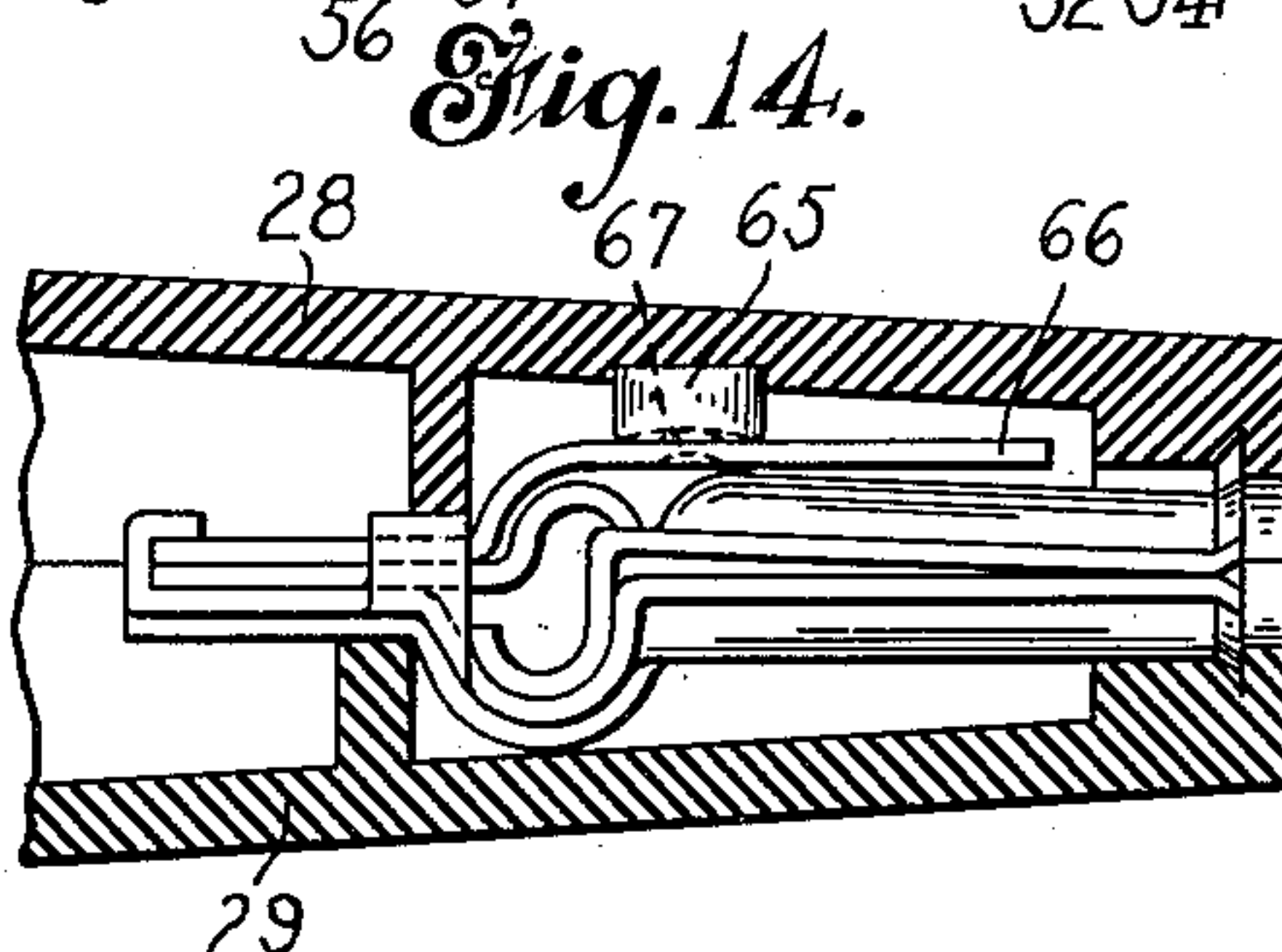
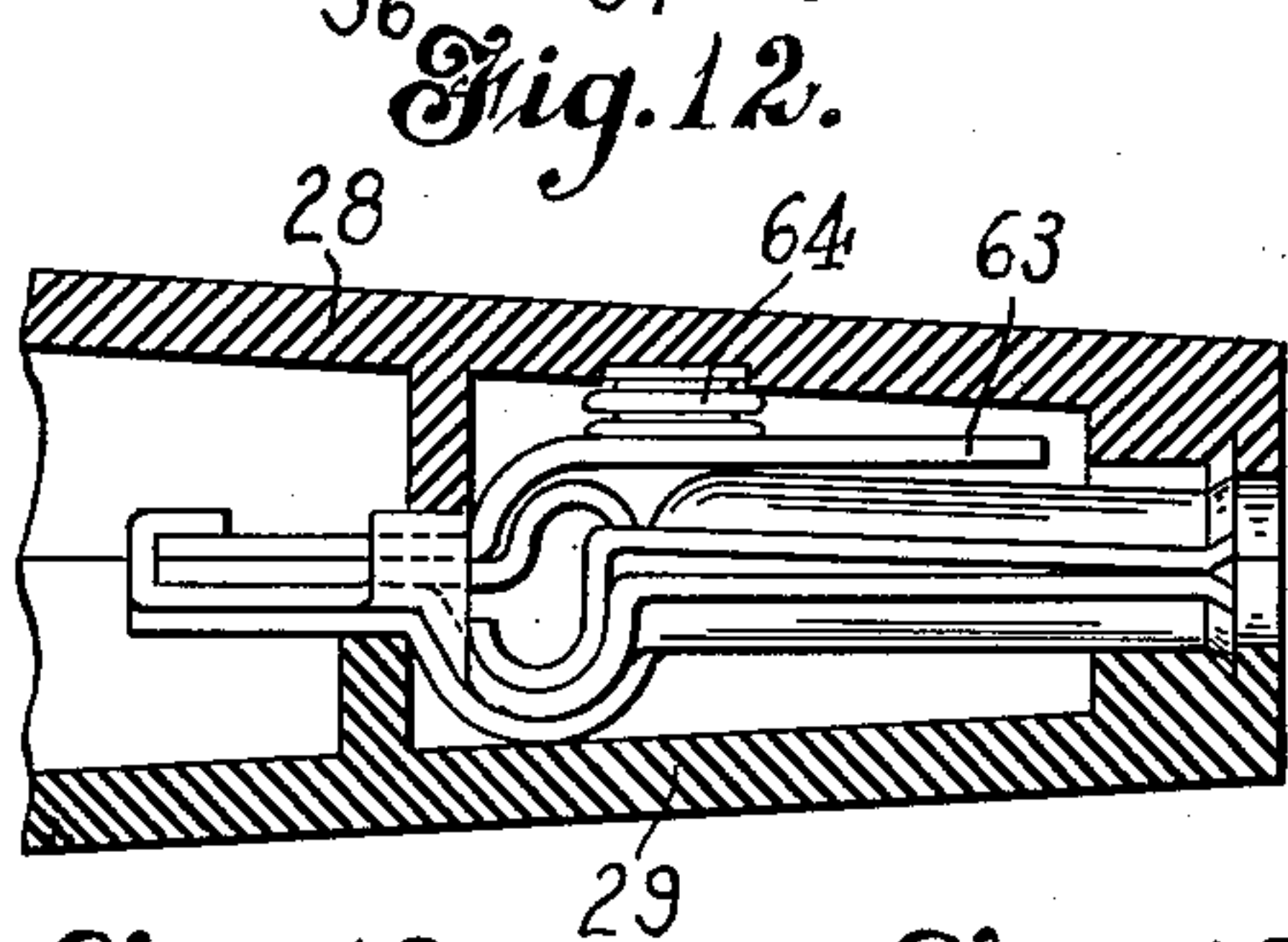
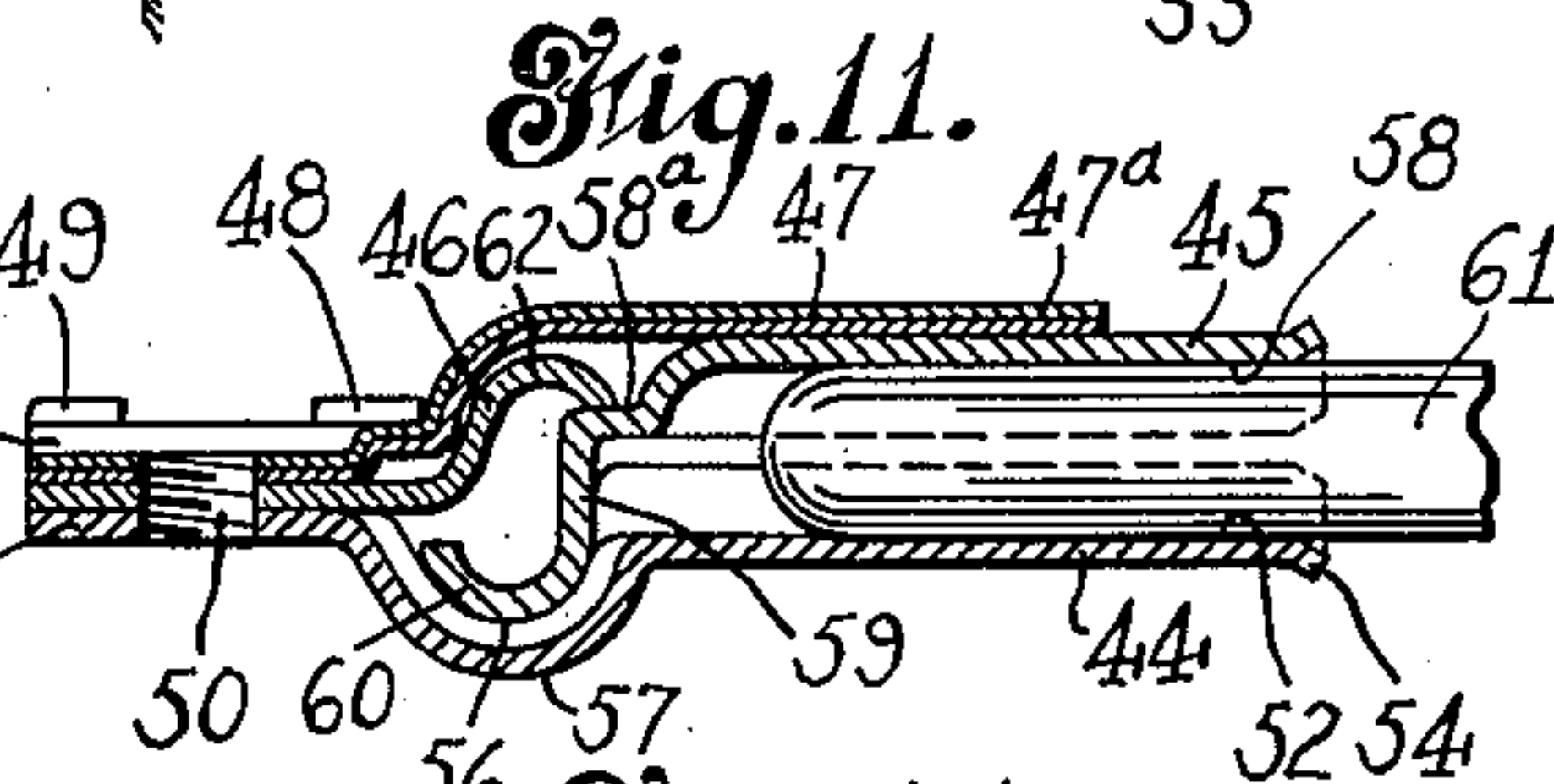
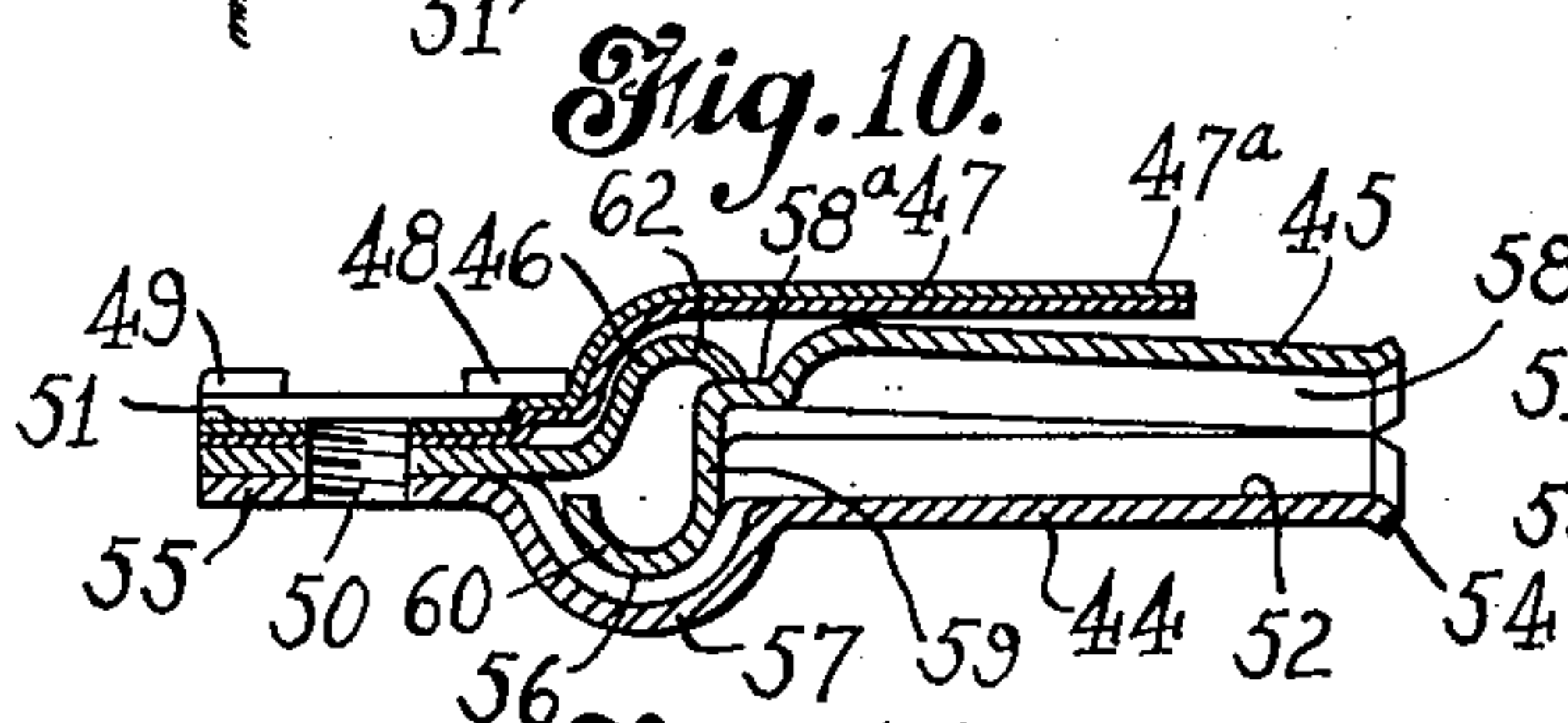
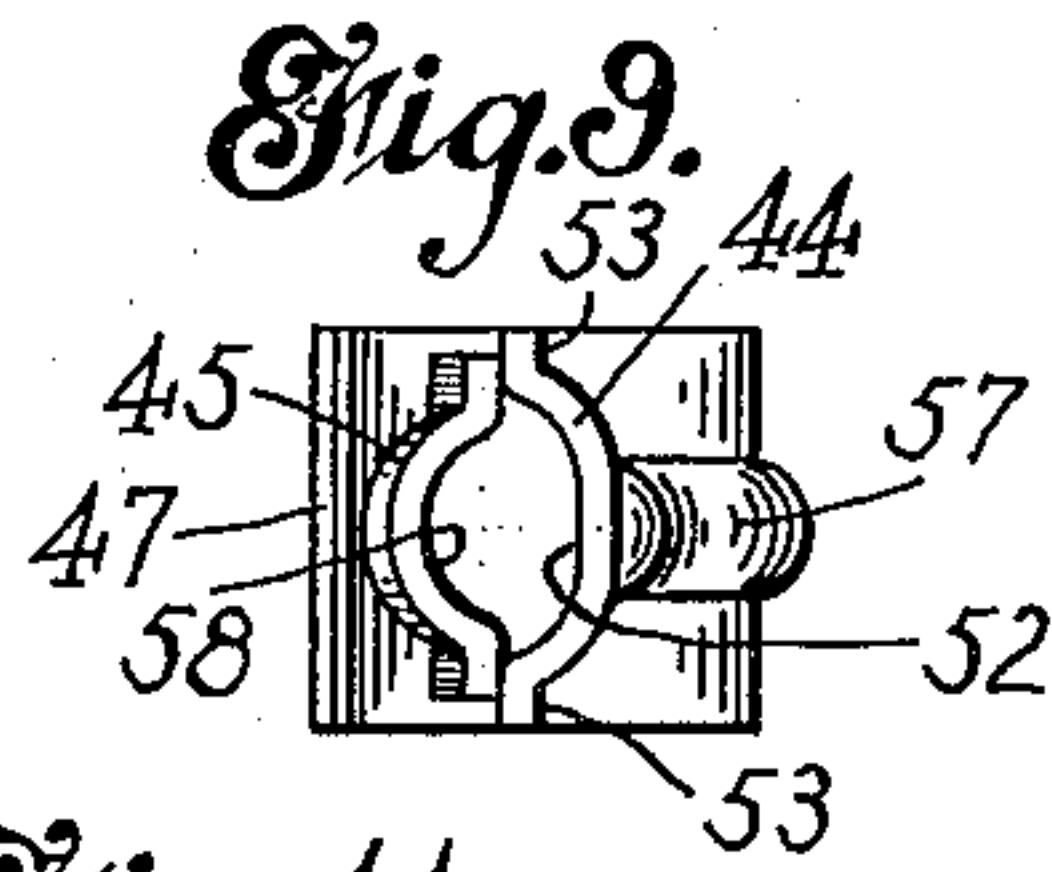
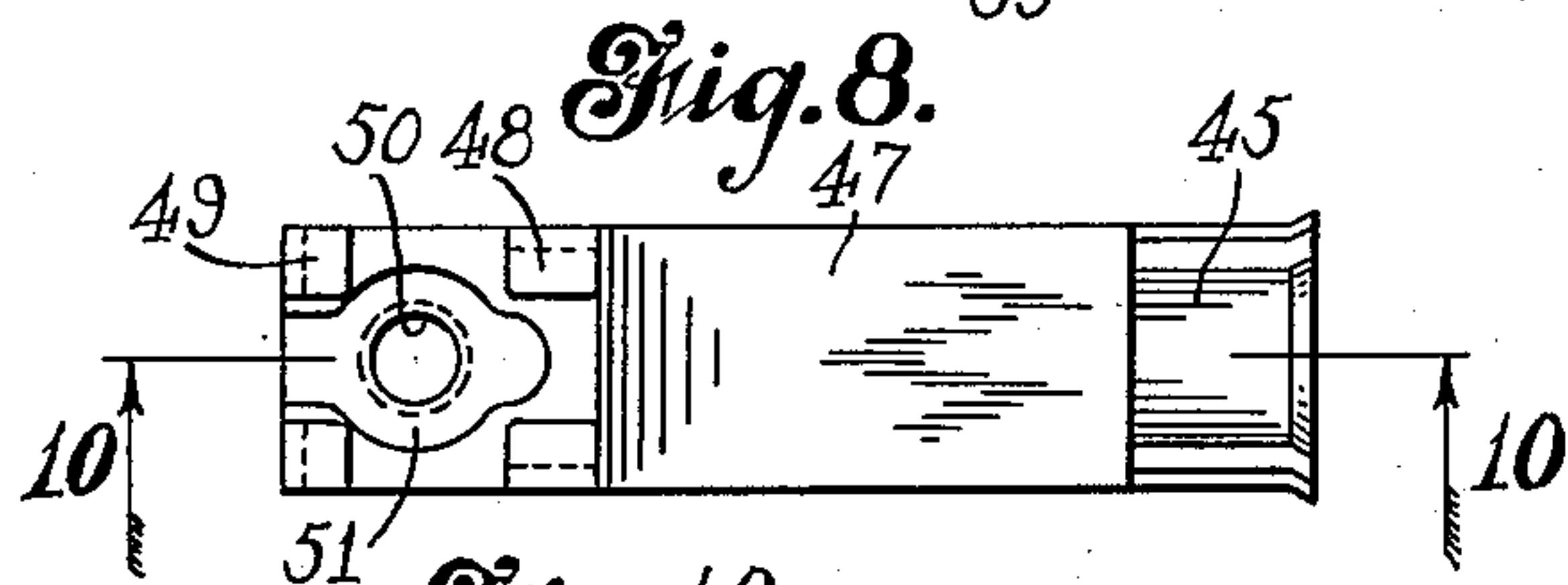
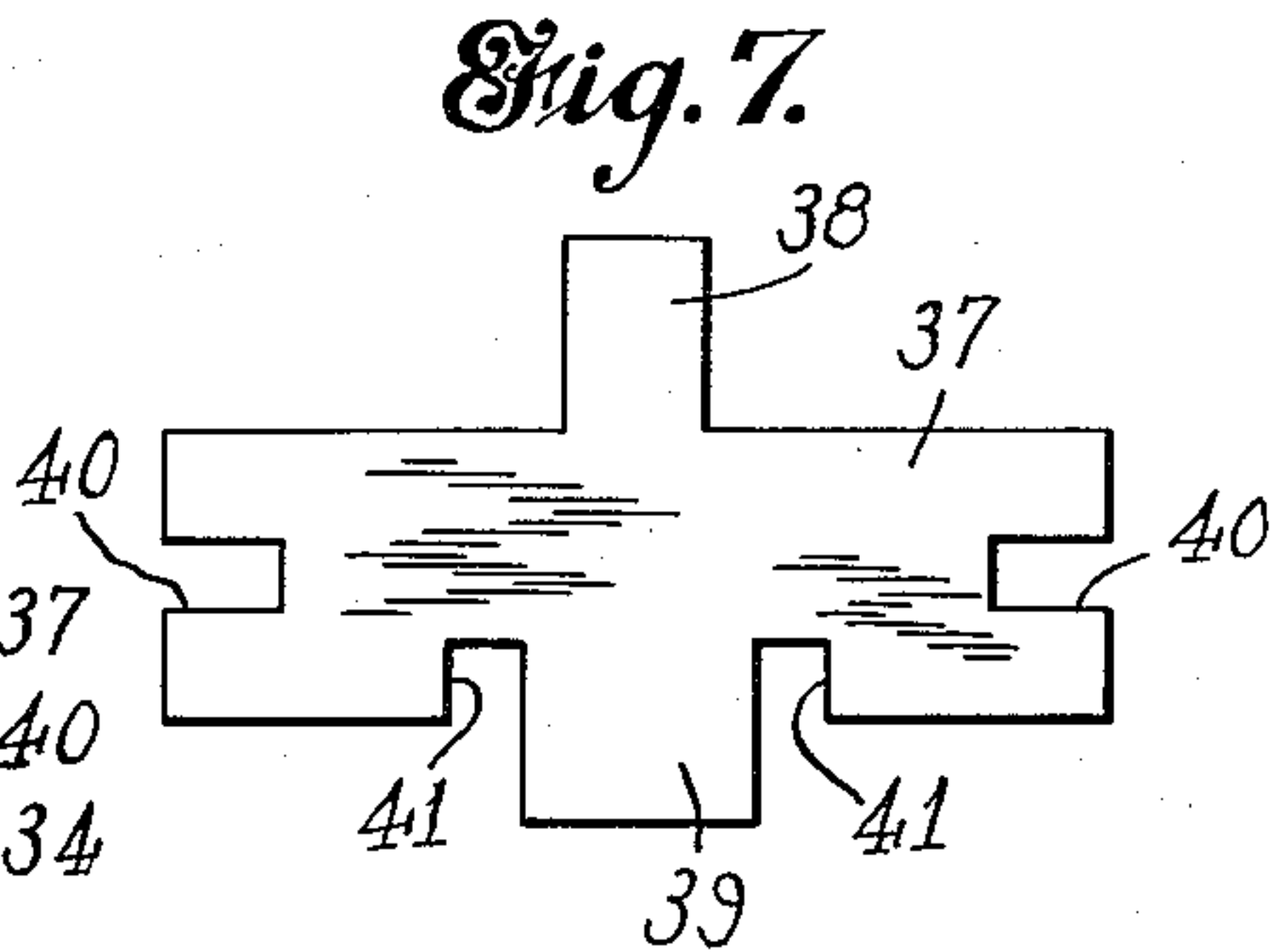
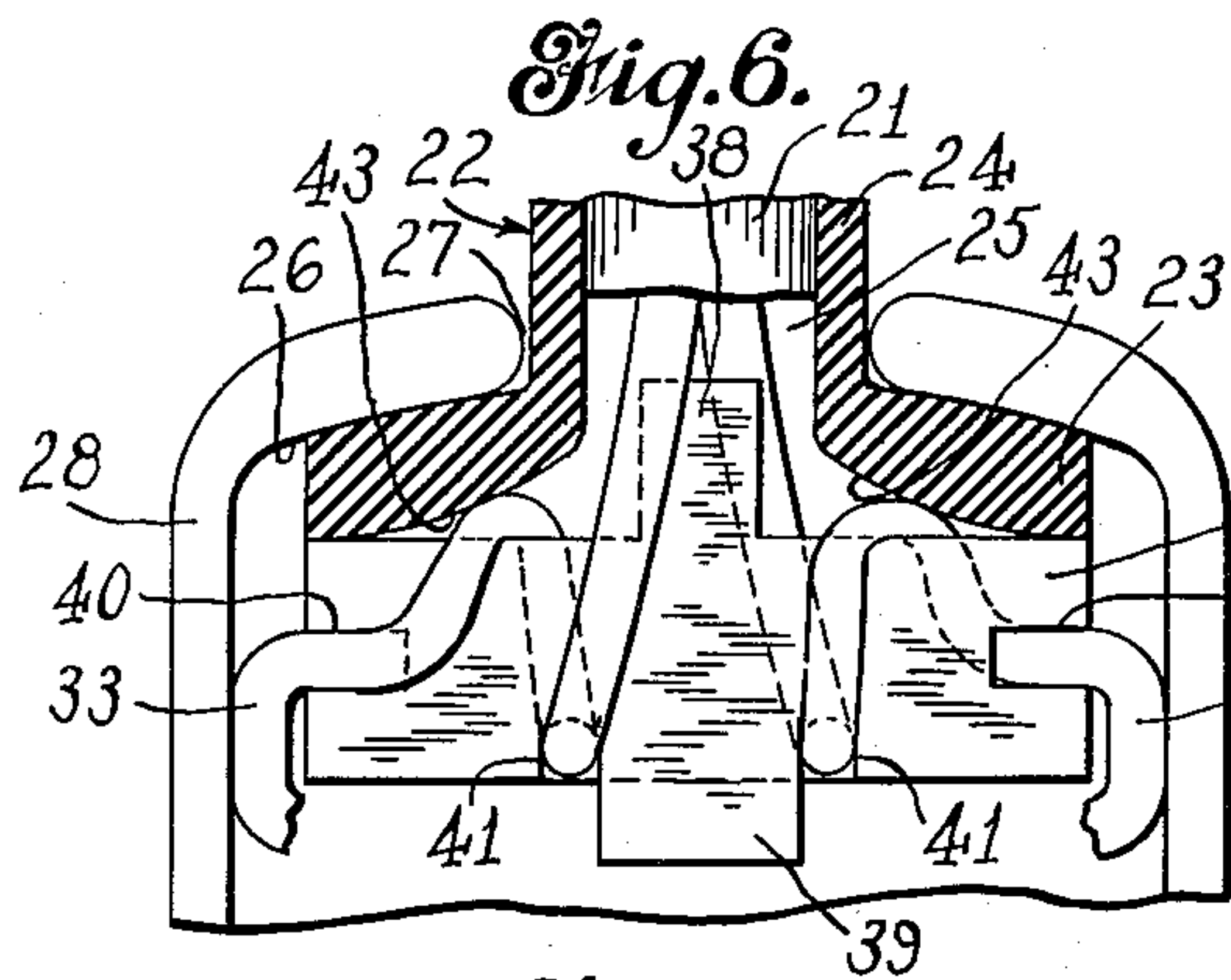
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CORD GUIDE MEMBER FOR UTENSIL PLUGS

2 Sheets-Sheet 2



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# UNITED STATES PATENT OFFICE

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## CORD GUIDE MEMBER FOR UTENSIL PLUGS

Tomun Finizie, Bridgeport, Conn.

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4 Claims. (Cl. 173—332)

1

This invention relates to electrical connecting means, and is especially applicable to connecting plugs used in connection with flexible conducting cords which supply current to household appliances and the like.

In the use of the appliance, for example an iron, there is considerable wear on the cord, due to the flexing or twisting to which the cord is subjected in use, and there is considerable wear on the connector plug due to the strains to which it is subjected.

One of the objects of the invention is to reduce the wear on the cord and on the connector plug, and to provide a connection between the cord and plug which will withstand heavy pulling strains without injury, and relieve the strains on the plug.

Another object is to provide a connecting plug or like member of the character above mentioned, in which the structure is simple, compact and inexpensive.

Another object is to provide an electrical contact means adapted to receive a cooperating contact in the nature of a prong or stem, which is well adapted for use in connecting plugs or like members, and which insures good electrical connection between the parts and provides for the proper conduction of current without sparking or pitting of the contact member.

Another object is to provide a separable female contact member adapted to receive a contact prong, and equipped with means whereby the firmness of the contact between the two members is increased under the heating effect caused by the use of the appliance.

In the accompanying drawings:

Fig. 1 is a face view of a connecting plug embodying the invention;

Fig. 2 is an edge view;

Fig. 3 is a view similar to Fig. 1, showing one of the casing sections removed;

Fig. 4 is an enlarged section on line 4—4 of Fig. 3;

Fig. 4A is a fragmentary end view of the swinging or rocking member;

Fig. 5 is a section on line 5—5 of Fig. 3;

Fig. 6 is a section on line 6—6 of Fig. 4;

Fig. 7 is a detail face view of the strain-receiving insert or plate;

Fig. 8 is a plan view of one of the contact members;

Fig. 9 is an end view of said member;

Fig. 10 is a section on line 10—10 of Fig. 8;

Fig. 11 is a section similar to Fig. 10, showing the prong inserted;

2

Fig. 12 is a sectional view showing a modified form;

Fig. 13 is a detail of the thermoresponsive element used in the form of Fig. 12;

Fig. 14 is a view similar to Fig. 12, showing a further modification; and

Fig. 15 is a detail view of the thermoresponsive element shown in Fig. 14.

In the form shown in the drawings, the connector plug has a generally rectangular and flattened casing of insulating material, constructed in two sections, and provided within the lower part with contact terminals which are female terminals adapted to receive the connecting prongs or stems provided on the electrical appliance, for example a pressing iron. The plug also comprises in its structure a swinging member having a pivot pin received within a hollow top portion with which the casing is provided, said pivot pin being joined rigidly to a part in the nature of a handle projecting to the outside of the casing and operating in a cut-away portion or recess in the top of the casing, which cut-away portion or recess is adapted to limit the movement of the movable member in the manner hereinafter described. The exteriorly projecting part or handle on the movable member is hollow, so as to receive the conductor cord, and the conductor cord enters the plug through this part, and has its individual wires separated from each other in a location within the casing, the separated wires being reeved or wound upon a piece separate from and inserted into the pivot pin (which is hollowed out for the purpose), the arrangement being such that the strain is taken on the piece or insert and transmitted by the latter to the movable member of the plug. The separated wires coming from the cord and reeved on the insert, pass to the contact members in the lower part of the plug, with ample allowance for the movement of the movable member without placing strains on the wires that would tend to loosen their connection with the terminals. The terminals, as hereinafter described, are also of a special construction, embodying in their make-up suitable thermoresponsive devices which, under the action of the heat caused by the use of the appliance, increase the firmness of the connection between the female or socket contact members and the prongs, as hereinafter described.

In the drawings, the casing is indicated at 20, the conductor cord at 21, the swinging member pivotally mounted in the casing at 22, said member having the pivot pin 23 and the handle



3

24, and having the longitudinal bore 25 receiving the cord or other conductor. The portion of the casing 20 which receives the pivot pin is indicated at 26, and the opening in the top portion of the casing through which handle member 24 projects is indicated at 27. One of the sections of the casing is indicated at 28, and the other at 29, these sections being interconnected by screws 30. The socketed terminals in the lower part of the casing are indicated at 31 and 32, these being connected respectively to the separated wires 33 and 34 that are branched out from the cord internally of the plug, wire 33 being connected to contact member 31 by a binding screw 35, and wire 34 being connected to terminal 32 by a binding screw 36.

Referring to the details, the casing 20 is generally shallow and flat, and has the upper portion 26 elongated and rounded so as to receive within it the pivot pin 23, the latter being rounded and somewhat barrel shaped, and adapted to turn within the adjacent casing portion on an axis disposed transversely of the casing, the arrangement being such that the handle member can move in a plane generally perpendicular to the plane of the casing, with the pin acting as a pivot, but to a limited extent only, this movement being limited by the edges of the aperture 27. As appears from Figs. 1 and 3, the width of the aperture 27 is such as to prevent any substantial movement of the handle member longitudinally of the axis of the pivot pin, but, as shown in Fig. 2 by dotted lines, the handle member can swing forwardly or rearwardly to a position in which it is at an acute angle to the general plane of the casing, being capable of a movement from one of the dotted-line positions in Fig. 2 to the other, and in each case being limited from further movement by the side surface of the handle member coming up against the curved edge of the aperture 27. It will be noted further that in the form shown the handle member 24 extends from the pivot pin to a considerable degree, or, in other words, has considerable length, this being useful in avoiding any sharp bend in the cord. Moreover, for the latter purpose the free end of the handle member is preferably made bell shaped, as shown at 40<sup>a</sup>, the bell-shaped end having a flaring inner surface 41<sup>a</sup>, so that the cord entering the handle member, if bent or deflected to one side, will necessarily take a gradual curve corresponding to the gradual curve on the inner surface of the mouth or funnel of the handle.

The pivot pin 23 is cut away at the lower part to receive from beneath an insert piece or plate 37 about which the separated wires 33 and 34 are reeved or wound in the manner shown in the drawings. Preferably the piece or plate 37 is wedge shaped in transverse section, as shown in Fig. 4, having its thinner part uppermost, and preferably this piece or plate is substantially co-extensive in length with the pivot pin, and is provided centrally with an upward extension 38 and with a central downward extension 39, and with notches 40 at the respective ends, and with notches 41 in the lower edge located at the respective sides of the extension 39. The rounded or barrel-shaped pivot pin is hollowed out by being cut away at its lower part, having end notches 42 that lead by flared portions 43 in the plug to the bore 25. The bore 25 communicates with an enlarged cut-away portion in the middle part of the pivot pin, and the pin is cut so as

4

to have a slot at its lower edge extending throughout the length of the pin, and the notches 42 in the ends of the pin partially define this slot. When the insert is in place in the pivot pin, the upper end portions of the plate or piece take up against the upper defining surfaces of the notches 42, and the extension 38 extends upwardly toward the bore 25, leaving a certain amount of space for the electric wires, and the downward extension 39 projects downwardly out of the pivot pin, all the remainder of the insert or plate being within the lines of the pivot pin. As shown in Fig. 6, the wires 33 and 34 coming out of the cord are disposed at opposite sides of the insert, the wire 33 being brought down along the front face of the insert and carried back through one notch 41, and thence along the back face of the insert and forwardly over its upper edge and through one end notch 40. The wire 34, on the other hand, is brought down rearwardly of the insert (Fig. 6) and then comes forwardly through the other notch 41 and upwardly over the upper edge, and then downwardly to the other notch 40, and then forwardly. It will be evident that upward strain placed upon the wires will be taken up by the insert and transmitted to the ends of the pivot pin, so that the strain is effectively taken up in the movable member of the plug, there being ample slack between the movable member and the binding posts 35 and 36, so as to prevent any strain upon the terminals of the plug.

The conductor cord, even if frequently flexed or bent in the use of the electrical appliance, will not be bent adjacent the connector plug in a manner which can injure the cord, owing to the fact that any bending in the region where the cord enters the plug is necessarily on a gradual curve. Moreover, the angle between the cord and the plug can adjust itself to a certain extent with reference to the plug, owing to the movability of the externally projecting member of the plug with reference to the general plane of the casing, because this will, in many cases, obviate the need of bending the cord adjacent the mouth portion of the handle member. It will be apparent from Fig. 2 that the swinging of the cord-positioning external member to an inclined position with reference to the plug body or casing will reduce the angularity of the incoming cord, and thereby reduce strain and tension on the cord, with the accompanying harmful effects.

A further advantage of the article arises from the fact that a substantial handle portion is provided upon the plug, the arrangement being such that the user, in disconnecting the plug, will grasp the handle rather than the cord, thereby obviating the strain on the conductor and its connections. The arrangement of the pivot pin and the insert are such that the article can be very readily assembled and disassembled, and, moreover, the structure is inexpensive, while at the same time the relief of strain and wear within the interior of the plug is a matter of great importance, materially improving the service of the plug and increasing its life.

The binding screws 35 and 36 are screwed into the terminals and carried thereby, the terminals being fitted in recesses of the cover member 29 and being held in place by the cover member 28, and the binding screws being at the upper ends of the terminals and being readily accessible upon removal of the cover member 28. In Fig. 5 the structure of terminal 32 is shown, and as



5

the terminals are identical a description of one will suffice. As shown in section in Fig. 10, the terminal comprises a lower member 44, which is stationary and forms the lower part of the prong-receiving socket; an upper member 45 that is pivoted in relation to member 44 and provides the upper part of the socket; a spring 46 pressing upon and controlling the member 45; and a bi-metallic element 47 that acts as hereinafter described to increase the firmness of the electrical connection. The members 44, 45, 46 and 47 all have free forward extremities, and at their rear extremities they are clinched together in superposed relation by means of lugs 48 and 49 extending upwardly from the lowermost member 44. In the portions of these members that are clinched together, a tapped hole 50 is provided, adapted to receive the binding screw, and around the upper end of the tapped hole is a depression 51 in the bi-metallic member 47, which depression receives the wire end that is to be clamped in place.

The lowermost contact member 44 is provided with a flat dished longitudinal groove 52 adapted to receive the cooperating prong, there being narrow lips 53 at the respective sides of the groove, and the groove being flared at its mouth portion, as shown at 54. Between its main body portion and the part 55 at the rear that is clamped to the spring member 46, the member 44 is provided with a bend that provides a rounded depression 56 in which is received the rear portion of the member 45 for the purpose of providing a pivotal support for member 45. Exteriously of the member 44, an integral longitudinal rib 57 is provided upon that part of the member which provides a rounded seat for the member 45. The upper socket member 45 presents a longitudinal groove 58 that is somewhat narrower than the previously described groove 52, and somewhat more rounded, the object being to have the upper socket member available to clamp the prong, even if the members 44 and 45 are somewhat out of alignment with each other at their forward ends. Adjacent its rear end the member 45 is bent to provide a knee portion 58<sup>a</sup>, having a flat upper surface to be contacted by the forward edge of the spring 46. From the knee portion 58<sup>a</sup> the member 45 is continued downwardly against a shouldered portion on member 44, as shown at 59, and the part 59 is then curved rearwardly and upwardly to form a curled extremity 60 that conforms to the curved seat 56, previously described, so as to enable the member 45 to tilt or tip relatively to member 44 from the position shown in Fig. 10 to the position shown in Fig. 11 under the action of the inserted prong 61. The spring 46 comprises a plate which is curved upwardly and then downwardly, as shown at 62, to provide a curled end, the forward edge of which engages the knee 58<sup>a</sup>, with pressure normally holding the members 45 in the position of Fig. 10. The bi-metallic element 47 is made of two parts, there being an upper part or layer of brass and an under part or layer of steel. The rear part adjacent the binding screw socket is as previously described, and from this part the bi-metallic member is curved upwardly so as to provide a forwardly projecting part 47<sup>a</sup> that will be disposed alongside of and make contact with the upper socket member 45, as shown in Fig. 11.

In the inoperative position shown in Fig. 10, the upper socket member has its socket portion in a somewhat downwardly tilted position, as

6

shown, its forward part being in engagement with the lower socket member, the upper member being held against longitudinal movement by its engagement at the rear portion thereof with the rear portion of the lower member, and the spring 46 holding the rear part of the upper member seated, the bi-metallic pressing or clamping member being out of engagement with the upper member. When the prong is inserted into the socket, as shown in Fig. 11, the upper member is tipped up against the action of the spring, and moves into engagement with or close to the bi-metallic pressing member. Under the action of the heat coming from the appliance or from some other source, the bi-metallic member is pressed into firm engagement with the upper socket member so as to press the prong very firmly between the socket members and effectively prevent the plug from slipping off of the prongs. This is a factor of considerable importance, as, owing to the manner in which connecting plugs are located with respect to pressing irons and similar appliances, with the plug in a projecting position, there is a tendency for the plug in the use of the appliance to be displaced from the prongs. This condition is met by the present contact member, where means is provided for increasing the grip upon the prong after the prong has been inserted into its socket.

In the modified form shown in Fig. 12, the bi-metallic element of the form previously described is replaced by a spring finger 63 of steel or the like, which is pressed down against the upper socket member by a small metal bellows 64. In this particular form the bellows is fixed by cement or the like to the casing section 28.

The form shown in Figs. 14 and 15 is similar to that shown in Figs. 12 and 13, the thermo-responsive element in this case being a cup-like member 65 pressing down upon a plain spring 66 acting upon the upper socket member. In this case the spring 66 has on its upper surface a small boss 67 making contact with a dished bottom 68 of the cup-like member 65.

It will be noted from Figs. 3 and 6 of the drawings that, in the form shown, the wires extending from the swivelling member to the binding screws of the terminals extend from the ends of the pivot pin or pivot element of the swivelling member. The notching of this element at the ends, as shown in Fig. 4<sup>A</sup>, permits the wires to be extended substantially longitudinally out of the ends of the element. The downward extension or lug 39 on the insert serves as a means for holding the insert in proper position when the parts of the device are assembled, said extension or lug being in engagement with a shouldered portion 69 of the plug body when the parts are in the assembled position. Also, the insert and its associated wires are firmly held in the pivot member by reason of the forcing or wedging of the member comprising the insert and the wires into the receiving space provided therefor in the pivot pin, which space has defining surfaces that diverge in a downward direction.

The showing in the drawings is by way of example only, and various modifications and changes may be made without departing from the principles of the invention or the scope of the claims.

What I claim is:

1. In a connector plug, the combination of a sectional body equipped interiorly adjacent one end of the body with terminals, the other end



7

of the body containing an interior chamber or socket, a swivelling cord-guiding member having a pivot member movably mounted in said socket, a wedge-shaped strain-relieving insert received in a wedge-shaped recess in said pivot member, and a cord extending into the swivelling and pivot members and having wires passing from the cord toward and to said terminals, the incoming portions of said wires being looped around the insert and firmly wedged within the recess.

2. In a connector plug, the combination of a sectional body equipped interiorly adjacent one end of the body with terminals, the other end of the body containing an interior chamber or socket, a swivelling cord-guiding member having a pivot member movably mounted in said socket, a wedge-shaped strain-relieving insert received in a wedge-shaped recess in said pivot member disposed at the side toward said terminals, and a cord extending into the swivelling and pivot members and having wires passing from the cord toward and to said terminals, the incoming portions of said wires being disposed respectively at opposite sides of the insert, the wires being wound about the insert and wedged within the recess.

3. A connector plug having a body equipped interiorly adjacent one end with terminals and having socketed in the other end a swinging cord-guiding member having a pivot member extending crosswise with respect to the body and cut away lengthwise and receiving within it a strain-relieving insert disposed longitudinally of said pivot member, and a cord extending into said pivot member and having wires passing out

8

of said pivot member toward said terminals at the ends of said pivot member so as to be proximate to the turning axis of said pivot member.

4. A connector plug having a body equipped interiorly adjacent one end with terminals and having socketed in the other end a swinging cord-guiding member having a pivot member extending crosswise with respect to the body and cut away lengthwise and receiving a strain-relieving insert disposed longitudinally of said pivot member, and a cord extending into said pivot member and having wires passing out of said pivot member toward said terminals at the ends of said pivot member so as to be proximate to the turning axis of said pivot member, the cut-away portion of the pivot member being wedge-shaped and the insert being wedge-shaped and the wires being firmly held between the two.

TOMUN FINIZIE.

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