April 29, 1969 G. A. SCHONAUER 3,441,242

PASSAGE FORMER

Filed Jan. 10, 1967 Sheet 1 of 2

Fig. 1.

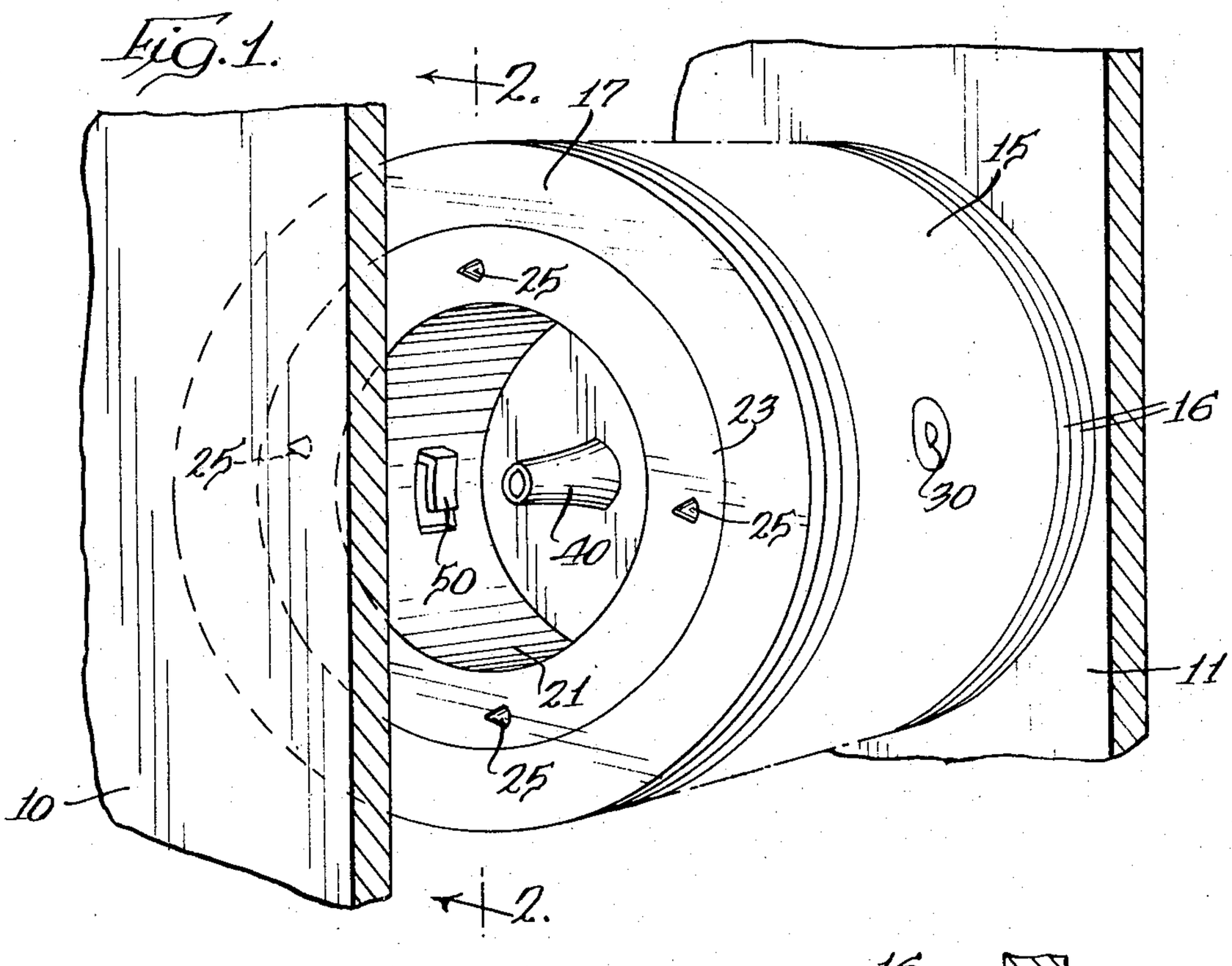
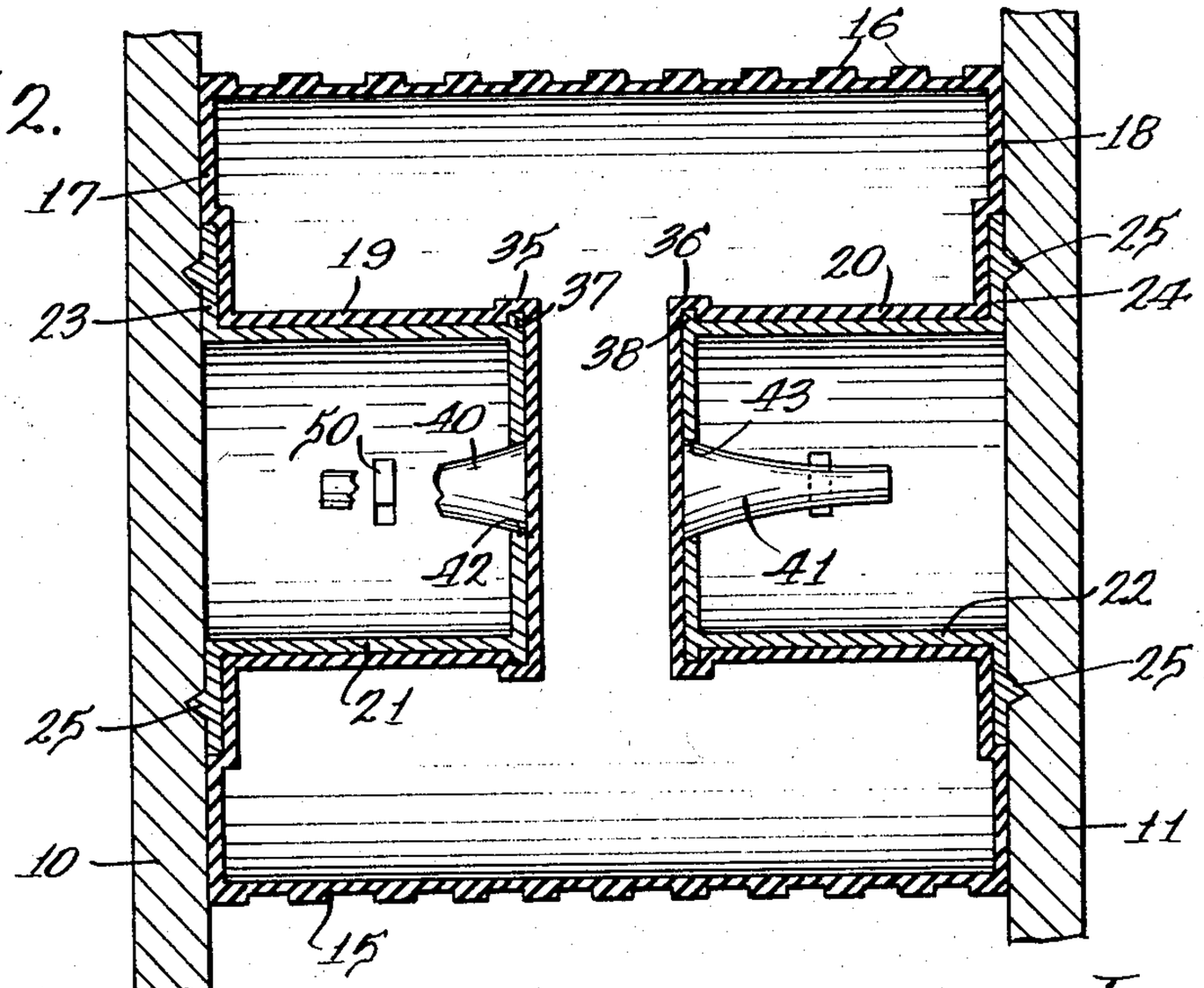


Fig. 2.



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Fig. 5.

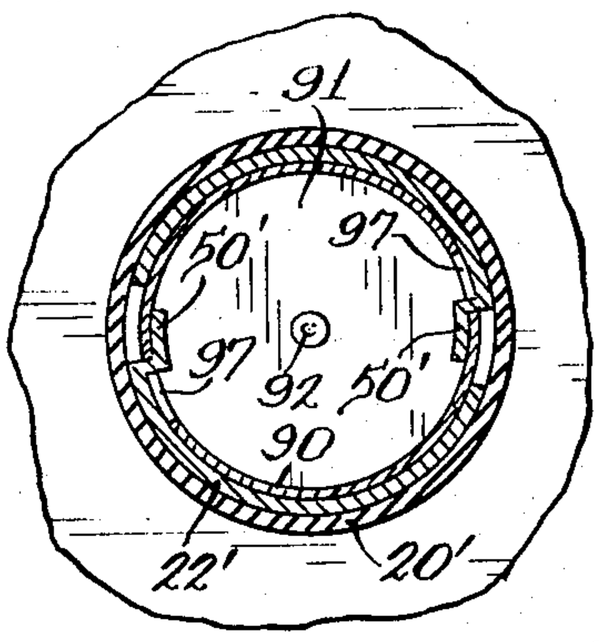


Fig. 4.

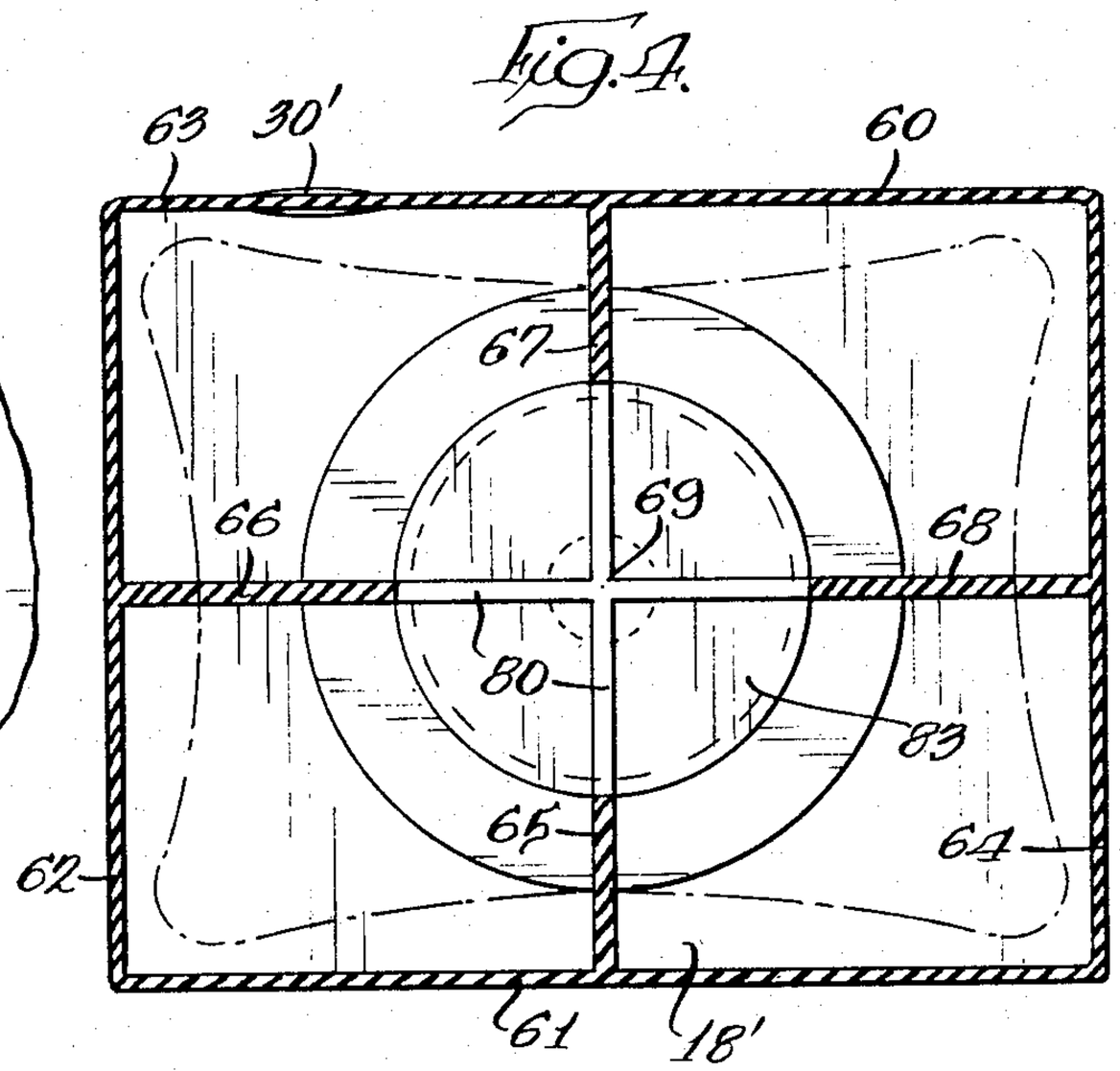
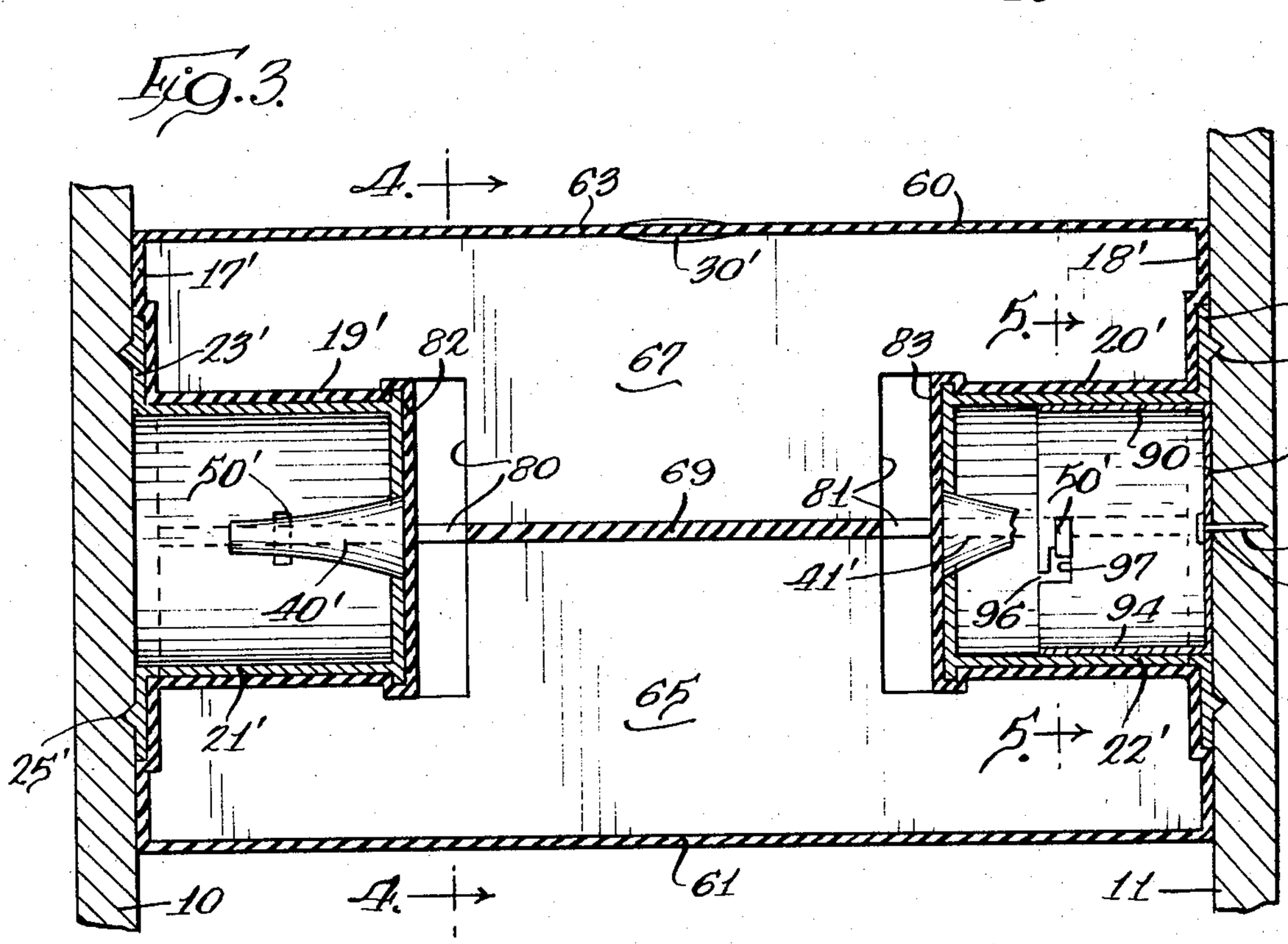


Fig. 3.



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PASSAGE FORMER

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U.S. Cl. 249—65 7 Claims

ABSTRACT OF THE DISCLOSURE

A passage former for use with forms for concrete, or the like, to provide a through passage in the concrete after the poured concrete has set and having an expandable sleeve with structure at the ends thereof to impale the concrete forms when expanded to hold the former in position, accessible means for inflating the sleeve after the sleeve is positioned between the forms and means accessible from an end of the sleeve for deflating the sleeve after the concrete has set and the forms are removed to facilitate removal of the former.

This invention relates to a passage former for use with forms for concrete, or the like, providing a simple structure to obtain a through passage in the concrete after setting thereof for passage of utility pipes, lines, or other equipment.

At the present time, when concrete is poured for foundation walls, special provision must be made in advance of pouring the concrete to provide for openings in the wall for passage of utility lines or pipes, and if this is not done, then it is necessary to knock a hole in the wall after the concrete has set and the forms have been removed. If preliminary steps are taken, this has commonly been done by obtaining lumber and building a wooden structure between the forms which will provide an auxiliary form about which the concrete flows during pouring and after the concrete has set and the forms are removed, there is then a passage existing through the concrete. This results in a time-consuming, cumbersome operation and by the invention disclosed herein, this operation can be done simply by use of a prefabricated passage former which can be used repeatedly.

An object of this invention is to provide a new and improved passage former for use with concrete forms to provide a through passage in the concrete after it has set.

Still another object of the invention is to provide a remotely positionable passage former having an expandable sleeve with means at opposite ends for biting into the concrete forms to hold the sleeve in position when expanded with means disposed between the ends of the sleeve to permit inflation thereof when positioned between the forms and alternate means at one or both ends of the sleeve to permit deflation thereof after the forms are removed and subsequent withdrawal of the former from the concrete because of the contraction of the sleeve away from the concrete.

Still another object of the invention is to provide a passage former with provision for pre-attachment thereof to a single form at one end of the sleeve and with provisions for forming passages of various shapes depending upon the initial shape of the expandable sleeve.

Further objects and advantages will become apparent from the following detailed description taken in connection with the accompanying drawings in which:

FIG. 1 is a perspective view of a preferred embodiment of the passage former shown in position between a pair of concrete forms, with the forms shown in section and broken away;

FIG. 2 is an elevational view, taken centrally through the passage former and generally along the line 2—2 in FIG. 1;

FIG. 3 is a view, similar to FIG. 2, of another embodiment of the passage former;

FIG. 4 is a vertical section, taken generally along the line 4—4 in FIG. 3, with the unexpanded shape shown in broken line; and

FIG. 5 is a vertical section, taken generally along the line 5—5 in FIG. 3 showing tht use of an auxiliary mounting spool for use with the passage former of the embodiments of FIGS. 1 and 2 or the embodiments of FIGS. 3 and 4.

While this invention is susceptible of embodiment in many different forms, there is shown in the drawings and will herein be described in detail an embodiment of the invention together with a modification thereof with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the invention to the embodiments illustrated. The scope of the invention will be pointed out in the appended claims.

First referring to the embodiment shown in FIGS. 1 and 2, the passage former is shown in position between a pair of forms **10** and **11** which are normally of wood and assembled to provide a space therebetween into which concrete can be poured for forming a foundation wall, or similar wall. As commonly known in the art, after the concrete has set the forms are removed.

The passage former embodies an expandable sleeve **15** formed of rubber, neoprene, or other similar types of material to be expandable and which may be reinforced, if desired. The sleeve **15** has a generally cylindrical shape and circumferentially extending ribs **16** providing a generally circumferential rigidity when inflated, while providing for expansion generally along the central axis of the passage former to increase the end-to-end length of the passage former. The sleeve has end walls **17** and **18** integral with the cylindrical wall of the sleeve and each wall has a centrally located well of a cylindrical shape defined by annular walls **19** and **20** depending inwardly therefrom. Each of the walls **19** and **20** receives a cup-shaped member **21** and **22**, respectively, fitted within the well and having a peripheral flange **23** and **24**, respectively, extending radially outwardly from the sleeve walls **19** and **20**. The flanges **23** and **24** define toothed means with teeth or cleats **25** on each of the flanges **23** and **24** projecting outwardly from the ends of the sleeve to bite into or impale the concrete forms **10** and **11** when the sleeve **15** is expanded and as shown in FIG. 2. The end walls **17** and **18** of the sleeve are set back in the areas coinciding with the flanges **23** and **24**, as shown in FIG. 2.

The cylindrical wall of the sleeve **15** is provided with a bladder-type valve **30** communicating with the interior of the sleeve whereby insertion of a needle connected to a supply line for fluid, preferably air, will direct fluid under pressure into the interior of the sleeve. The pressure causes the sleeve to increase in length and drive the teeth **25** into the forms and secure the sleeve to the forms prior to pouring of the concrete. If it is physically possible to manually engage and position the sleeve between the forms, this can be done. If this is not possible, then the former can be manipulated remotely by holding the hose to which the needle is connected. When the sleeve is manipulated into proper position between the forms, fluid is dircted through the hose and the valve **30** into the sleeve to expand it and hold it in position. Following this, the hose and needle are removed. Upon inflation, the outer annular portions of the sleeve end walls **17** and **18** also will be firmly forced against the forms, to seal off the cup-shaped members and their peripheral flanges from the

concrete so that concrete cannot float into the end areas of the sleeve.

In order to hold the cup-shaped members **21** and **22** in assembled relation with the sleeve **15**, each of the walls **19** and **20** of the sleeve wells are provided with annular recesses **35** and **36**, respectively, which flexibly and releasably lock against annular flanges **37** and **38** of the cup-shaped members **21** and **22**, as shown in FIG. 2.

With the sleeve expanded, as described above, and securely held in position to the forms by the teeth **25** having dug into the form material, the concrete can be poured and will flow around the sleeve **15**. After the concrete has set, the forms are removed with the passage former still positioned within the concrete wall. At this time, the valve **30** is not exposed, so that it cannot be used for deflating the expandable sleeve **15**. Means are provided for deflating the sleeve to facilitate its removal from the concrete comprising tire-type valves with there being a valve **40** at one end of the sleeve, and a valve **41** at the other end. Each of these valves communicates with the interior of the expandable sleeve **15** and is connected to the wall of the sleeve. The bases of the cup-shaped members **21** and **22** are provided with central openings **42** and **43**, respectively, to permit extension of the valves **40** and **41** outwardly toward the ends of the passage former, but terminating short thereof. With this structure, upon removal of one or both forms, at least one of the valves **40** and **41** is exposed so that fluid can be exhausted from the expandable sleeve with the result that the passage former can then be withdrawn from the opening formed in the concrete.

It will thus be evident from the foregoing structure and described operation thereof that the passage former can be used repeatedly when it is desired to form a passage generally of the shape of the passage former. There can be a variety of sizes for different size openings.

Each of the cup-shaped members **21** and **22** are provided with a pair of inwardly extending and oppositely positioned locking tabs **50** providing for an alternate type of mounting of the passage former which will be described in more detail in connection with the embodiment of the invention shown in FIGS. 3 and 4.

In the embodiment of FIGS. 3 and 4, the expandable sleeve **60** is similar in function to the previously described sleeve **15**, but primarily differs in the cross sectional shape and in the internal construction generally required to obtain this shape. Insofar as the components associated with the sleeve are the same as those referred to in the embodiment of FIGS. 1 and 2, the same reference numerals have been assigned thereto and with a prime associated therewith.

The sleeve **60** is of generally rectangular cross section to define walls **61**, **62**, **63** and **64**, with the wall **63** having the needle valve **30'**. The sleeve in its unexpanded condition is shown in broken line in FIG. 4, with its expanded shape shown in full line in this figure. In order to generally approximate this shape, the interior of the sleeve **60** is provided with a series of ribs **65**, **66**, **67** and **68** extending inwardly from an adjacent wall, with which they are integral, to a common integral connection **69** disposed along the central axis of the sleeve. As shown in FIG. 3, the ribs extend from end-to-end of the sleeve and may optionally have end parts thereof integrally associated with the end walls **17'** and **18'** of the sleeve. In order to properly inflate the sleeve with the use of only a single inlet valve means, there must be fluid communication to the spaces between webs and this is obtained by having the webs cut out along the lines **80** and **81** to terminate short of the base walls **82** and **83** of the sleeve wells whereby fluid is free to pass to the spaces between all of the webs.

As with the structure in the embodiment of FIGS. 1 and 2, the form can be inflated through the needle valve **30'** and, after the concrete has set, the passage former can be collapsed back to generally the dotted line configuration

shown in FIG. 4 by exhaust of fluid through either of the valves **40'** or **41'**. Although the construction shown in FIGS. 3 and 4 can be positioned between the forms in the same manner as shown in and described in connection with the embodiments of FIGS. 1 and 2, it is also possible to pre-mount the passage former when only a single concrete form is in position and this mode of operation is shown in FIGS. 3 and 5. In order to accomplish this, a mounting spool **90**, in the form of a can, has a base **91** attachable against the form **11** by insertion of a nail **92** through a central opening **93** in the can base **91**. This operation is first performed and then the cup-shaped member **22** of the former sleeve is placed on the plug section **94** of the mounting spool by lengthwise relative movement. This relation is obtained by having the locking tabs **50'** move inwardly along end opening slots **96** located opposite each other in the wall of plug section **94** until they reach an elongate recess **97** and the cup-shaped member and sleeve are then rotated to place the tabs **50'** in the positions shown in FIGS. 3 and 5. The recesses **97** are slightly oversize to permit rotation without digging in of the cleats **25'**. After assembly, the sleeve can be pressurized prior to pouring of the concrete.

As stated above, the use of the mounting spool **91** can also be used with the expandable sleeve shown in the embodiment of FIGS. 1 and 2.

The walls of the sleeves disclosed and of the ribs in the embodiment of FIGS. 3 and 4, can be of varying thickness and material, such as rubber or neoprene and optionally can be reinforced with nylon or other materials to fit specific requirements. Also, the angular relation of the webs may be varied, depending upon the conditions encountered in the use of the passage former.

I claim:

1. A passage former for use with forms for concrete or the like to provide a through passage in the concrete comprising, an expandable sleeve with opposite ends, toothed means at each end of said sleeve, fluid inlet means intermediate the ends of the sleeve for expanding said sleeve when positioned between spaced apart concrete forms to drive the toothed means into the forms and hold the sleeve in position, and means at an end of said sleeve for deflating the sleeve after pouring of concrete and removal of a form to permit removal of the sleeve.

2. A passage former as defined in claim **1** wherein deflating means are positioned at each end of said sleeve and said toothed means includes a cup-shaped member with a peripheral flange having outwardly projecting teeth, and said deflating means includes a valve member positioned partially within said cup-shaped member to be set back from the concrete forms.

3. A passage former as defined in claim **2** wherein the circumference of the sleeve end is greater than that of said flange whereby expansion of the sleeve causes the ends of the sleeve to seal against the forms and seal off the flange from the poured concrete.

4. A passage former as defined in claim **2** wherein said cup-shaped member has an annular flange at the end thereof opposite said peripheral flange and said sleeve has a flexible annularly shaped recess to receive said annular flange and releasably lock said sleeve and cup-shaped member together.

5. A passage former as defined in claim **2** including a mounting spool having a base attachable against a concrete form and a plug section of a size to fit into said cup-shaped member whereby the sleeve can be mounted onto a form by connection to the pre-attached mounting spool, and means for fastening said sleeve to said spool.

6. A passage former as defined in claim **1** wherein said sleeve is cylindrical and of rubber or the like and said fluid inlet means comprises a bladder valve.

7. A passage former as defined in claim **1** wherein said sleeve is of a generally rectangular cross section with internal ribs extending between portions of the sleeve

wall to cause the sleeve to hold generally the same shape when expanded.

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U.S. Cl. X.R.

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