March 25, 1952 R. L. CRAIN 2,590,688

WELL MANIFOLD

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Fig. 1.

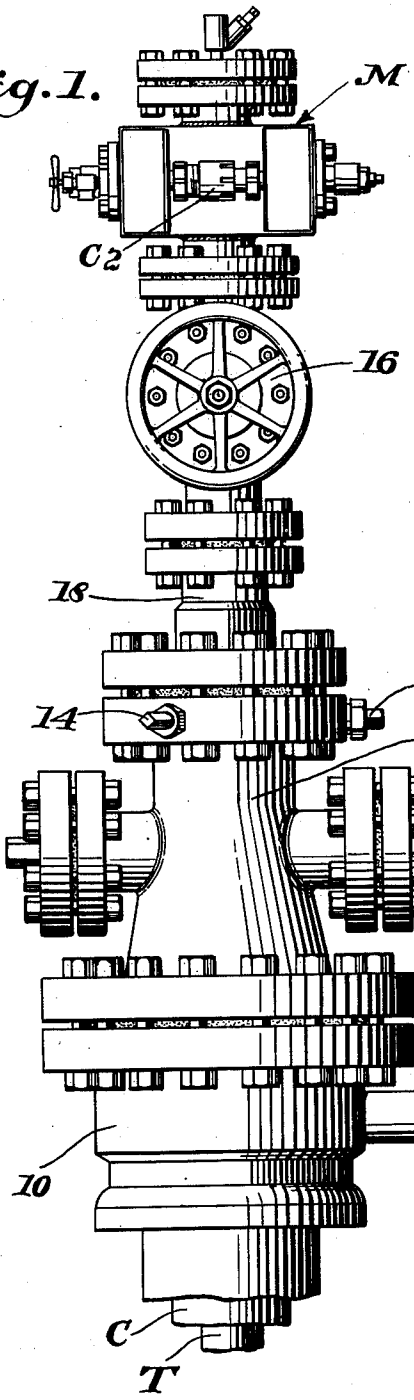
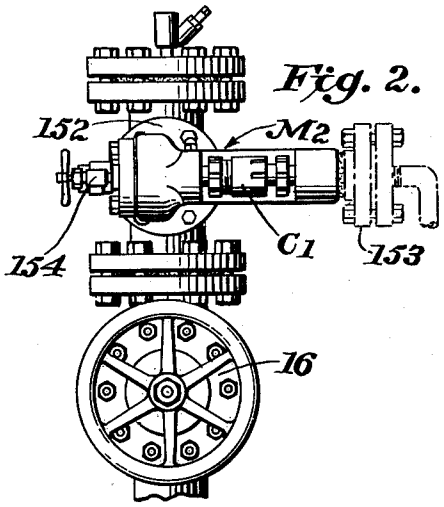


Fig. 2.



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Fig. 4.

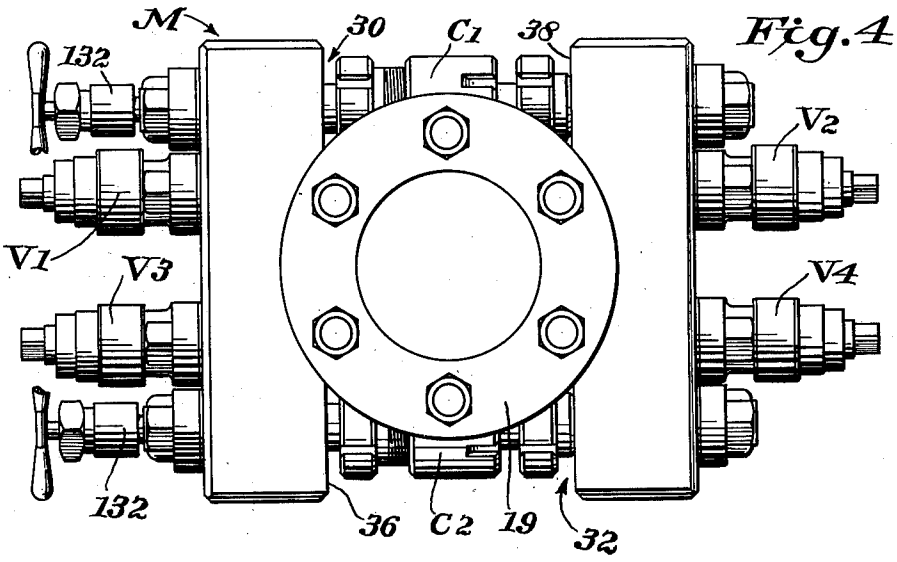
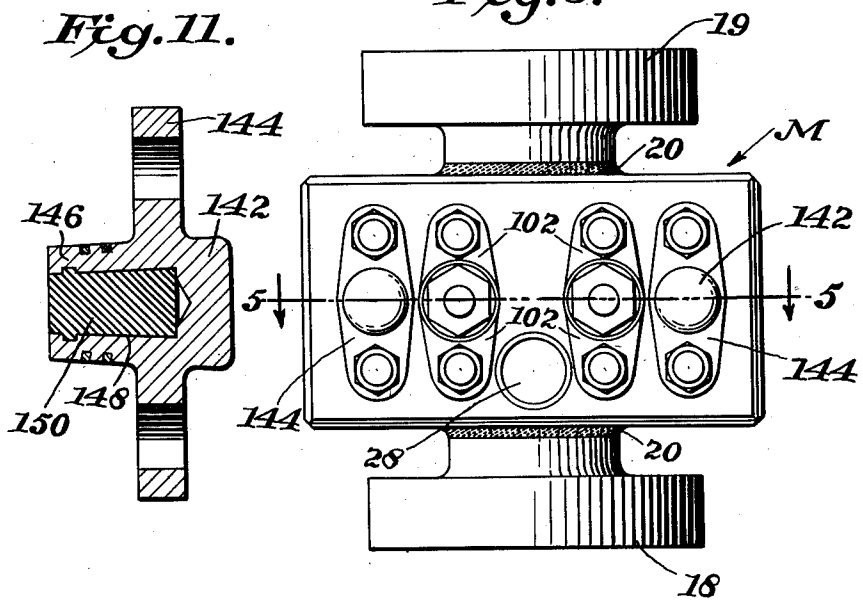


Fig. 3.

Fig. 11.



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WELL MANIFOLD

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Fig. 5.

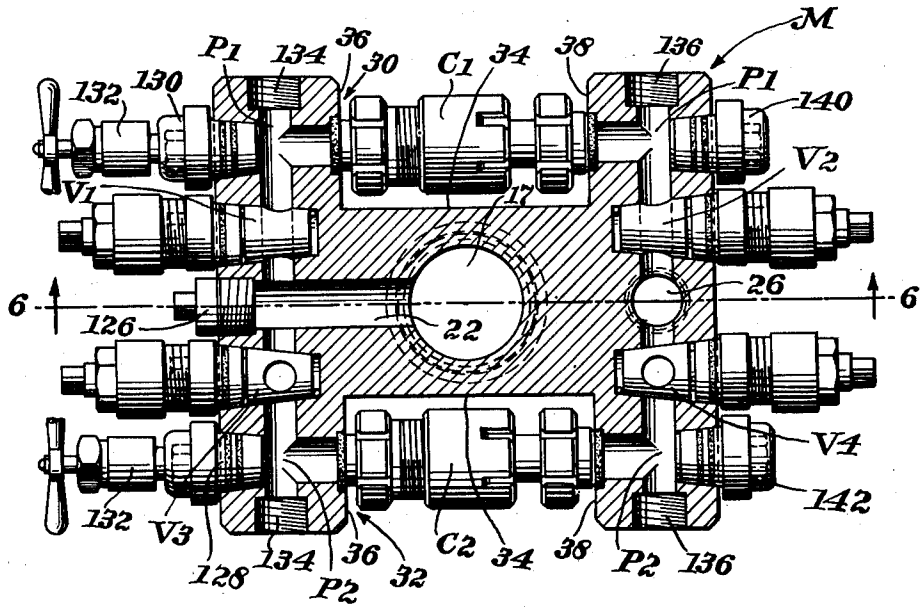
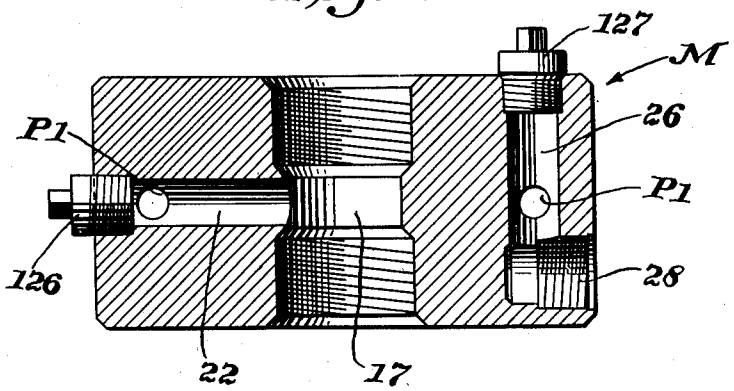


Fig. 6.



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WELL MANIFOLD

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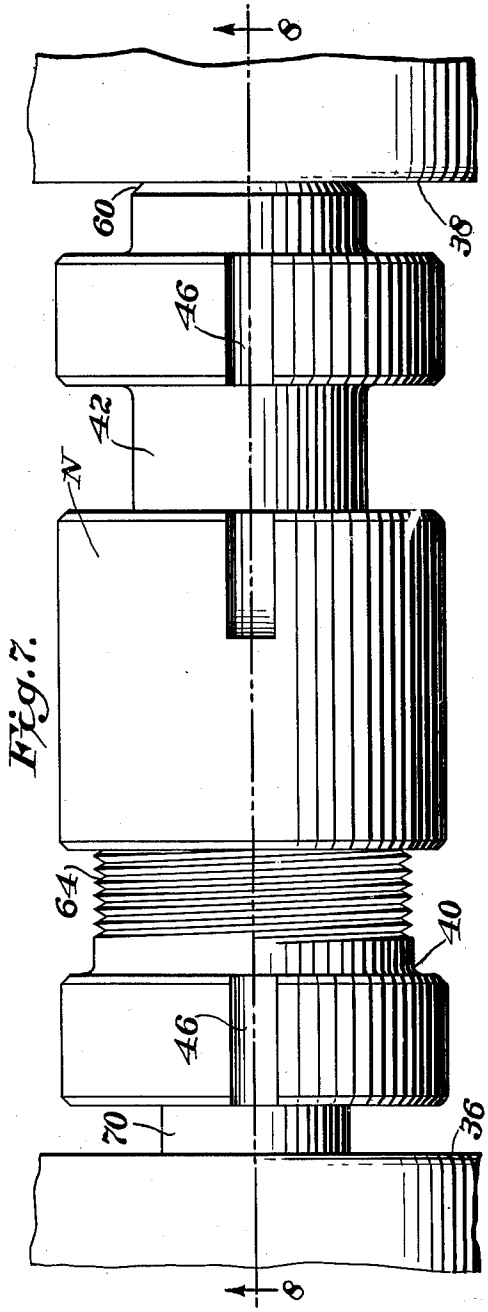


Fig. 7.

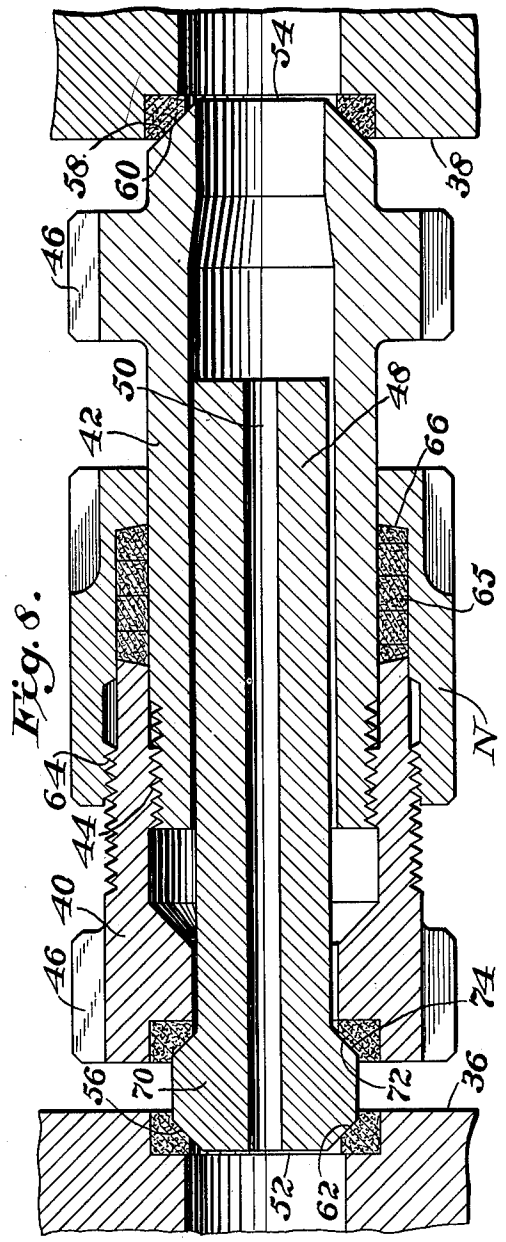


Fig. 8.

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WELL MANIFOLD

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Fig. 9.

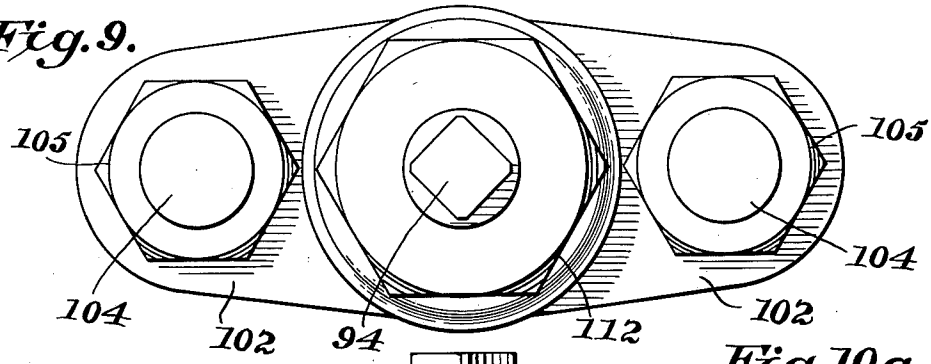


Fig. 10a.

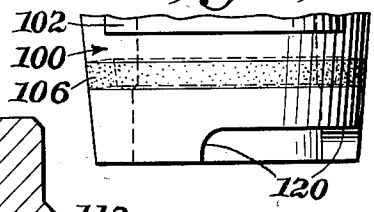


Fig. 10.

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WELL MANIFOLD

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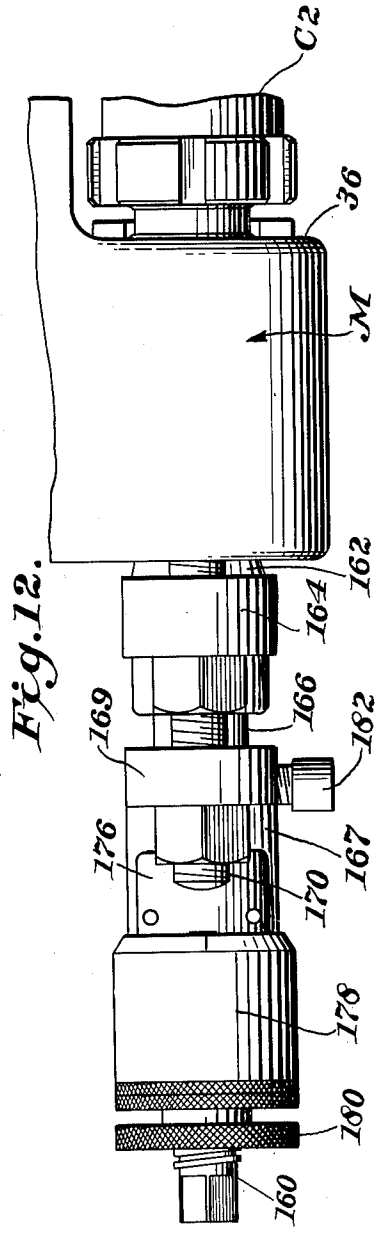


Fig. 12.

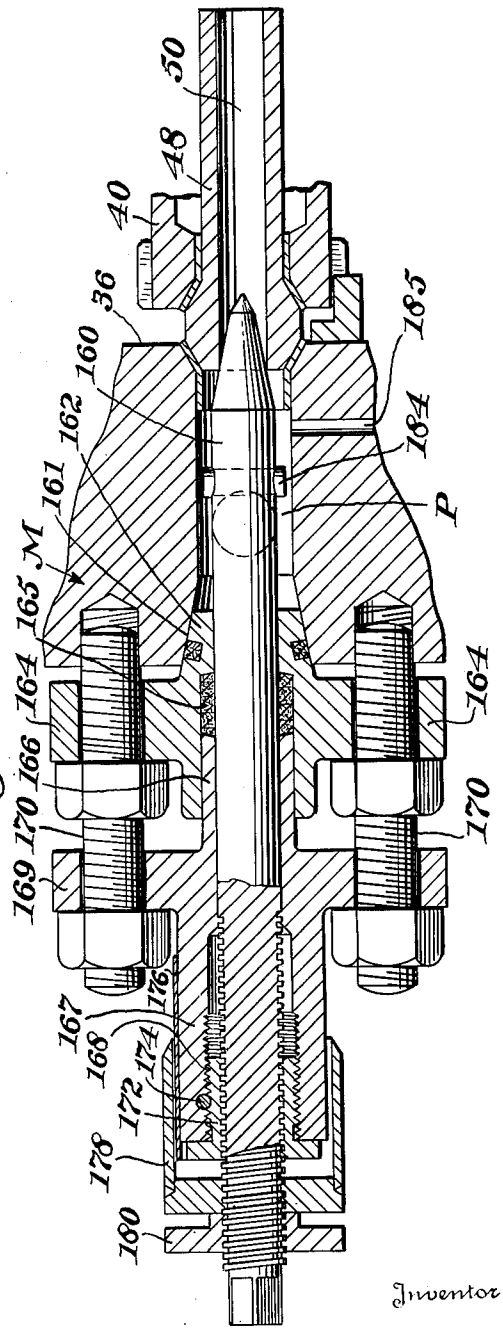


Fig. 13.

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WELL MANIFOLD

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Fig. 14.

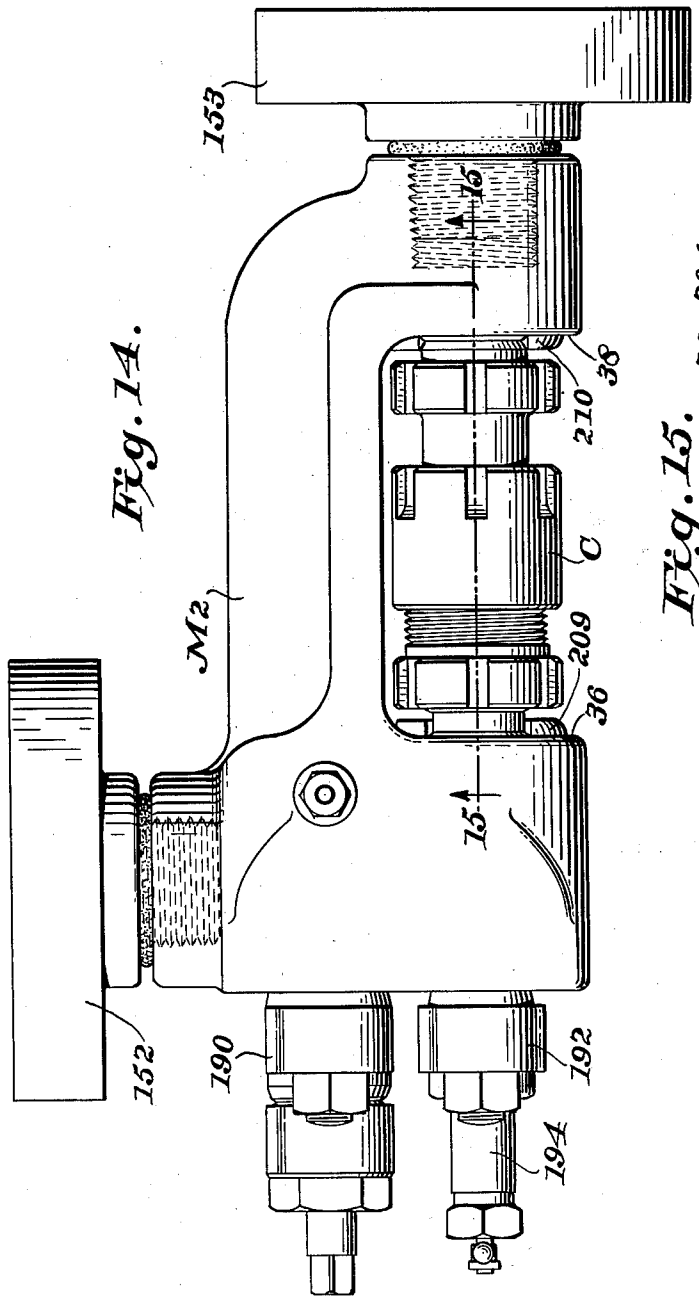
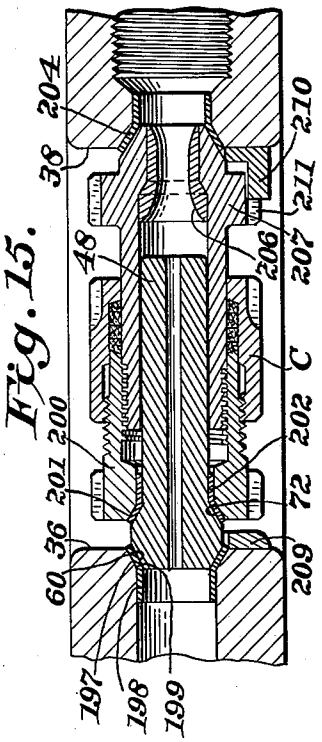


Fig. 15.



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Patented Mar. 25, 1952 2,590,688

UNITED STATES PATENT OFFICE

2,590,688

WELL MANIFOLD

Robert L. Crain, Houston, Tex., assignor to Gray Tool Company, Houston, Tex., a corporation of Texas

Application November 14, 1946, Serial No. 709,812

16 Claims. (Cl. 166—15)

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The present invention relates to a manifold of particular use on oil wells for controlling the flow of oil and gas therefrom. The invention constitutes an improvement of the general type of manifold disclosed in the patent to Cullen No. 2,043,428, June 19, 1936.

A principal object of the invention is to provide an improved manifold of the type referred to characterized by the simplicity of its construction and the ease with which certain essential parts, such as choke assemblies, may be removed for replacement of the choke bean when the latter becomes worn. I have provided an arrangement wherein choke assemblies of novel form are removable as units from the manifold, and which assemblies may be remounted in operating position in the manifold by simple expansion of the assembly. The choke assembly and its manner of mounting is characterized by the absence of exposed screw threads and the like in the pressure lines, and particularly at points where the choke makes contact or is attached to the body of the manifold. The construction is such as to avoid the use of screw threads at these points.

It is an object of the invention to provide a manifold of the type referred to which is of minimum size, particularly in the vertical dimension, and to reduce the extent of and increase the strength of parts protruding from the walls of the manifold, such as valve operating handles.

A further object of the invention is to provide such a manifold having its various valves and parts arranged in an orderly and convenient manner. For instance, it will be noted that the manifold comprises separate fluid passages for the well fluid, one on each side of the manifold, and in each passage there is a removable choke with valves on the up and down stream sides of the choke. It is the purpose of the invention to so construct the manifold and arrange the parts thereof with respect to one another so that the operating handles or other means for the valves which should be closed when a particular choke is removed, are found on the same side of the manifold as said choke.

Another object of the invention is to provide a manifold of the type referred to which is adapted to be positioned on the well head, for instance, above the master manifold control valve, having a full opening therethrough for removal or insertion of back pressure valves from or into the tubing, or for the performance of the operations in the tubing, such as are referred to in Patent No. 2,241,288, Yancey, May 6, 1941 (as illustrated in Figure 4 of said patent), while the manifold remains on the well.

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It is also a purpose of this invention to provide a single wing manifold choke assembly embodying certain of the principles mentioned above.

Included in the invention is a novel form of rotary plug type valve which satisfies the requirements of the manifold as generally enumerated above and as described below.

Various other objects and advantages of the invention will be apparent as the description herein progresses.

In the drawings:

Figure 1 is a side elevational view of the casing or tubing head of a well, showing the general position and relation of the manifold to other parts of the well.

Figure 2 is a similar partial side elevational view of equipment at the surface of a well, showing a manner of applying a modified form of the invention to the well. In this instance, the manifold is of the single wing type.

Figure 3 is a side elevational view of the manifold of the invention looking toward the outlet side.

Figure 4 is a top plan view of the manifold.

Figure 5 is a horizontal sectional view of the manifold, taken substantially along the line 5—5 of Figure 3, with details omitted for purposes of clarity.

Figure 6 is a vertical sectional view of the manifold taken substantially along the line 6—6 of Figure 5, with details omitted for purposes of clarity.

Figure 7 is an enlarged side or top view of one of the chokes.

Figure 8 is an enlarged longitudinal sectional view of one of the choke assemblies, taken along the line 8—8 of Figure 7.

Figure 9 is an enlarged end view of one of the plug valves.

Figure 10 is a central sectional view through a portion of the housing and through one of said plug valves.

Figure 10*a* is a detail view of the valve stop mechanism.

Figure 11 is a sectional detail view of one of the corner plug elements which absorbs the shock of the fluid after its velocity is increased by passage through the choke and when its direction of flow is being changed.

Figure 12 is a top plan view of a part of a manifold housing wherein an adjustable choke valve is provided to regulate the flow of fluid through the flow bean.

Figure 13 is a central longitudinal vertical sectional view through the modified arrangement of equipment shown in Figure 12.

Figure 14 is a top plan view of a modified or

simplified form of manifold wherein only a single flow wing is employed, and

Figure 15 is a view of a choke assembly and supporting structure, similar to Figure 8, showing certain modifications or improvements which may be employed.

The drawings show both single and double wing manifolds, and both fixed flow and adjustable flow chokes. It will be understood that either type of choke may be fitted at any choke position in either type manifold, the parts being interchangeable for these purposes.

Referring to Figure 1, the last string of casing is shown at C and it is supported in the casing head 10 in the well known manner. The flow tubing is shown at T, and it is landed and supported in the tubing head 12, as is also well known in the art. It is flow from the tubing T that the manifold of the present invention is adapted to control. The tubing hanger is locked in the head 12 by the well known locking screws 14. As is now well known in the art, at a stage in the completion of a well, the larger control equipment is removed and a master manifold valve 16 is positioned on the well, either directly on the tubing head 12, or on top of any form of adapter 18 as may be required. While the "tubing head" comprises the element 12 with the hanger seat therein, in referring to the parts on which the manifold is mounted, it will be understood that this term generally includes all of the parts mounted on the element 12, such as valve 16 and its adapter, and which directly support the manifold.

The valve 16 constitutes the master control for the flow of oil or gas from the well, and when this valve is closed, all flow ceases. It is usually the custom to regulate the flow of fluid from the well by a choke, positioned in the flow line beyond the valve 16. The said Cullen patent teaches the broad idea of providing a unitary assembly with two flow passages therethrough, each passage having suitable valves and chokes therein, it being possible to regulate the flow of the well through either or both of said passages, and to continue the flow of the well without interruption in case it becomes necessary to replace valves or chokes in either passage. In Figure 1, the manifold M of the present invention is shown bolted in sealing engagement with the top flange of the valve 16, whereby when the valve 16 is open, control of fluid from the well may be regulated by the agencies in the manifold M. It will be understood that an important object of the invention is to provide a manifold having a full and central opening therethrough (vertically) so that it need not necessarily be removed from the casing or tubing head of the well when it is desired to go down through the tubing with tools for the performance of various operations therein.

Referring to Figures 5 and 6, the manifold M comprises a rectangular block of metal suitably cut out at various points to form the foundation for the other elements removably attached to the block.

There is a central vertical opening 17 through the block of metal which is in alignment with the flow tubing when the manifold is assembled on the well. This central opening may be threaded as shown for direct connection with pipes or fittings, or for connection with the threaded ends of flanged connections, such as shown at 18 and 19 in Figures 3 and 4, the connections being welded to the top and bottom faces of the block,

as at 20 (Figure 3). The top and bottom faces of the block may be otherwise formed to effect the desired connection, for instance by providing them with outwardly extending bolts which pass through openings in the flange to which the block is connected, appropriate nuts being used to bolt the flange to the block, with any suitable sealing ring positioned between the flange and the face of the block to form a seal around the opening through the block.

Substantially centrally of the vertical height of the manifold there is a side outlet conduit 22 which leads from the central vertical passage 17. At the outer end of conduit 22 and near one end face of the block, this conduit separates into two oppositely directed separate or independent passages P1 and P2. The passages P1 and P2 extend in opposite directions from their common conduit 22 and through the block adjacent the end and side faces thereof where they rejoin one another in a common vertical passage 26 from which extends a side outlet 28. It is with this side outlet that the flow lines to the oil tanks, separators or the like are connected.

As will be apparent from Figure 5, each of the passages P1 and P2 is interrupted by respective cut-outs in the side wall of the housing, same being generally designated as 30 and 32. These cut-outs are defined by inner walls 34 and by opposed end walls 36 and 38, and it is between these end walls that the removable choke assembly, later to be described, is expanded or wedged, each choke assembly comprising a choke bean having a restricted longitudinal bore therethrough which completes the passages P1 and P2.

In the passage P1 and on opposite sides of the choke assembly C1, there are closure valves V1 and V2, and on opposite sides of the choke assembly C2 in the passage P2 there are closure valves V3 and V4. When the valves of a set are open, as in the case of valves V1 and V2, fluid can flow from the well through the passage P1. It will usually be the case that the opposite set of valves V3 and V4 are kept closed in order to flow only through one of the passages, although it would be possible to flow simultaneously through both passages. In this connection, I have designed a special form of rotary plug valve which can be effectively used as the closure valve in this manifold.

The construction of the choke assembly is best illustrated in Figures 7 and 8. Referring to Figure 8, it will be noted that the choke carrier of the assembly comprises at least two choke retainers 40 and 42, which are threaded to one another as at 44, the sleeve like portion of the member 42 fitting within the sleeve like portion which constitutes the inner end of the member 40. The members or retainers are hollow, as shown, to form a surrounding, supporting and protecting casing for the choke bean. When the members 40 and 42 are turned in one direction with respect to one another, as by means of wrenches applied to the wrench openings 46, the carrier is elongated, whereas opposite turning movement of the two members will cause the carrier to contract. It will be noted that the carrier has a longitudinal passage extending entirely therethrough, and it is in this passage that the choke bean 48 is located, said bean having a restricted passage 50 therethrough. The walls 36 and 38 of the cut-out portion of the manifold block have openings 52 and 54 therein leading to the flow passages, these openings being unthreaded, and respective sealing surfaces in the form of packing rings 56

and 58 are provided in the face of the walls 36 and 38 surrounding the openings. As will be apparent from Figure 8, the ends of the choke assembly are provided with surfaces 60 and 62, which when the assembly is expanded, abut against the sealing surfaces 56 and 58 and form a tight seal therewith around the openings 52 and 54. When the choke assembly is wedged in position as shown in Figure 8, the passage 50 through the flow bean 48 is in proper alignment with the openings 52 and 54, the latter forming a part of the flow passage P1 or P2. When the assembly is expanded, and is in desired adjustment, a packing gland nut N which is threaded to the extending sleeve of the collar member 40 as at 64 is tightened inwardly, and packing 65 in an internal cavity in said nut is pressed by the rear wall 66 against the end of the member 40 and against the outer surface of the extension of the retainer 42 to tightly seal the space between the two members or retainers of the carrier.

The flow bean 48 has at one end thereof an enlarged head 70, and it is on this head that the outer beveled surface 62 is provided to engage the sealing surface 56 on the wall of the housing surrounding the opening therein. The head 70 also has an inner bearing surface 72 which is adapted to engage a sealing ring 74 in the outer end of the retaining member 40 to seal off the interior of the choke assembly. It will be apparent that the choke thus provided is of pronounced simplicity. The choke assembly is a self-contained and unitary structure capable of convenient application to and removal from the manifold by simply turning the choke retaining members 40 and 42 with respect to one another.

It will be noted that there are no objectionable arrangements wherein screw threads are present in the pressure line subject to leakage. It is not necessary to provide special means to insure a seal around threads, such as the introduction of special plastic packing under pressure, and other like expedients as are required in the case of other manifolds known in the art. The flow bean 48 is, of course, readily removable from the two-part carrier by simply sliding it endwise out of said carrier when the assembly has been removed from the manifold.

The plug valves of the manifold are of special type as shown particularly in Figure 10. In that figure, the body of the manifold is shown at M and in each of the positions somewhat diagrammatically indicated in Figure 5, a conical valve seat 80 is cut extending across the particular passage P in the housing. Positioned in this conical seat in the manifold body is a rotatable conical plug valve member 82, having a lateral passage 84 therethrough adapted to be aligned with or turned at right angles to the passage P depending on whether it is desired to have the passage open or closed. The plug valve has on its outer face an outwardly extending circular wall 86, which is integral with the body of the plug, and extending diametrically through this wall 86 is an opening 88 through which a connecting pin 90 is passed, this pin being fixed in an opening 92 in the lower end of a valve operating stem 94. The diameter of the opening 88 is slightly greater than that of the pin 90, in order to permit pivoting movement of the valve body 82 to a limited extent with respect to the operating stem 94 in one direction, while the turning of the pin 90 in the opening 88 permits limited pivoting movement of the valve body with respect to its operating stem in another direction. This universal play thus permits the valve to adjust itself in its seat. Suitable longitudinal grooves 91 may be provided in the conical surface of the valve seat between the ends of the passage P to provide for lubrication of the engaging surfaces of the valve and seat.

The open end of the valve seat 80 is closed by a conical valve retaining plug member 100 which has flanges 102 suitably secured to the face of the body of the manifold by bolts 104 and nuts 105. Sealing rings 106 may be provided on the conical portion of the plug member 100, to enter and form a seal in the open end of the seat 80. The plug has a central opening therethrough to receive the shaft 94, and within the plug there is packing 108 which is compressed against a ring 110 by a follower 111 which in turn is forced inwardly by a cap nut 112 threaded as at 114 to a threaded circular wall 115 on the outer side of the plug. It will be noted that the plug valve does not extend to the bottom of the seat opening 80, an oil chamber space 116 being provided below the bottom face of the valve plug. A passage 117 leading from a fitting 118 at any appropriate point on the outer wall of the manifold is provided in order to inject grease or other lubricant under pressure into the space 116 in order to dislodge the valve 82 from its seat when it has become stuck or for purposes of removal of the valve when necessary. Lubrication of the engaging valve surface is also provided for from the chamber 116 by the grooves 91.

It will be noted that one end 119 of the pin 90 protrudes beyond the outer surface of the circular wall 86 on the valve plug, and this end moves in a groove or cut-out 120 in one side of the inner end of the valve plug 100. This cut-out 120 may extend through any desired arc, such as 90°, to limit the turning movement of the valve between open and closed positions, and the ends of the groove may constitute stop surfaces to engage the end 119 of the connecting pin at the termination of the desired movement of the valve.

It will be observed that the inner end of the plug 100 does not engage the outer end of the plug valve, so that all inward pressure of the valve onto its seat is supplied and regulated by the cap nut 112. That is to say, the plug valve and its end ring 86 turn freely in the plug 100 between open and closed positions (as limited by the ends of the groove 120), but longitudinal pressure urging the valve inwardly against its seat may be exerted by tightening the cap nut 112. Such tightening forces the follower 111 inwardly, compressing the packing tightly around the rod 94 and causing ring 110 to bear against the end 86 of the valve, to thus press the latter into its seat.

To change the position of the valve, it is only necessary to apply a wrench to the flattened end of the rod 94 and turn it, after preliminarly relieving longitudinal pressure on the valve by loosening nut 112, if this is necessary. When the valve has been turned, the cap nut may be tightened as necessary to seat and seal firmly, the valve and its associated parts. Of course, if the valve should become stuck after remaining in one position for a long period, lubricant pressure may be applied beneath the valve plug by connecting a suitable gun to the fitting 118 after loosening the cap nut 112.

It will be understood that the valve as just described may occupy any of the positions V1, V2, V3 or V4 of Figure 5, and will also constitute the

plug valve of the single wing manifold of Figure 14.

Returning now to Figure 5, it will be understood that two longitudinal and two transverse passages are cut entirely through the block as a manufacturing expedient when the block is being formed. All of the resulting openings through the wall of the plug are not used, and may be plugged up after all of the necessary bores have been drilled. For example, a plug 126 may be provided to close the outer end of the passage 22, and a similar plug 127 may be used to close the upper end of vertical passage 26 (Figure 6). These plugs can be of the threaded type, and may be flush at their outer ends with the surface of the block. Plugs 128 and 130 are likewise provided at corners of the housing where oppositely extending portions of the passage join one another. Instead of a simple plug, however, the closure for the openings at 128 and 130 may include a bleeder or relief valve of some kind as at 132, which is useful in bleeding pressure from the proper side of the line when both valves on that side have been closed preparatory to removing a choke from between the valves. These plugs and valves may be carried on a flange plate bolted to the face of the block, if desired, similar to the provision of the flange 102 for the plug 100 as shown in Figures 9 and 10. Similarly, the openings 134 serve no useful purpose after the machining of the parts has been completed, and these openings may be closed with a simple type of plug. The same applies at the openings 136 near the opposite ends of the passages P1 and P2.

The plugs at 140 and 142, which are on the down stream side of the chokes are of special construction as shown in Figure 11. Like many of the other fittings disclosed herein, these plugs are carried by flanges 144 which are bolted to the face of the housing. The plug part 146 which enters and forms a seal with the seat in the housing has a central cavity 148, inwardly presented, which is filled with some substance 150, such as lead, which can be replaced from time to time when worn. It will be understood that such a plug is present in the ends of each of the passages P1 and P2 where the pressure is delivered from the flow bean at high velocity. This removable plug with its lead filling 150 absorbs the wear of the velocity of the fluid. The worn lead can be melted from the plug and new lead poured in.

While I have disclosed the invention as including principally a complete manifold having two channels of flow therethrough, certain of the improved aspects of the invention may be used with manifolds having only a single passage therethrough. This is illustrated in Figure 2 where the manifold M2 is shown connected to a side flange 152 of a regular T fitting of an oil well. This manifold consists of a plug valve and a choke C in the order named from the flange 152 toward the flow line connection 153. There may be a bleeder valve 154 in this manifold between the plug valve and the choke.

If it is desired to more minutely control the flow of oil through the choke, in place of the simple plug closures or bleeder valve plugs, as shown at 128 and 130 in Figure 5, an adjustable choke needle valve member 160 may be provided, as illustrated in Figures 12 and 13.

The outer end of the passage in alignment with the choke bean may be tapered as at 161 to receive the tapered sealing plug 162, which is adjustably bolted through flanges 164 to the manifold housing. This plug has a central opening therethrough for the choke needle, and a stuffing box with packing 165 compressed by a gland 166 which is carried by a choke bonnet 167. This bonnet is flanged as at 169 and the same bolts 170 as are used to secure the plug 162 to the housing are used to attach the bonnet to the plug. The outer end of the bonnet has an adjustable choke bushing 172 threaded therein, and is locked when adjusted by a pin 174. The outer end of the choke needle is threaded in the bushing 172 for adjustment of its inner end into and out of the opening in the end of the choke bean.

There is an indicating plate 176 with appropriate graduations thereon fixed to the bonnet, and the position of the choke is indicated by the inner edge of a thimble 178 which is locked for movement on the outer end of the choke needle by a nut 180. Obviously, as the choke becomes worn, the proper indication of the degree of opening at the valve parts may be adjusted by changing the position of the thimble 178 with respect to the markings on the plate 176. A set screw 182 may be provided to hold the choke needle in adjusted position. The needle may have a cross pin 184 to prevent its removal through its stuffing box, or to prevent its being blown out of its plug by pressure.

In this arrangement, as the adjustable choke mechanism has taken the place which would be occupied by the bleeder valve, a separate passage 185 may be appropriately located in the housing for bleeding purposes, and may be controlled by any type of valve which it is not felt necessary to specifically illustrate.

Figure 14 is a top plan view of the single wing modification referred to in connection with Figure 2. The housing M2 is of modified construction, but it is similar to the principal embodiment in that it has a cut-out defined by the walls 36 and 38 between which the choke assembly C is removably positioned, as described above. As referred to in connection with Figure 2, this manifold may have any suitable connecting parts to attach the same respectively to the christmas tree and to the pipe lines leading to storage tanks, etc. As indicated in Figure 2, the Figure 14 embodiment has flanged connecting members 152 and 153, which may be threaded into the inlet and outlet ends of the housing, and then welded thereto, in the same manner as the flange connections 18 and 19 as illustrated in Figure 3.

In this single wing housing, there is a plug valve 190 of the same type as previously described, and between the plug valve and the choke, the corner outlet may be closed by a plug 192 having a suitable bleeder valve connected therewith. However, an adjustable choke arrangement of the type shown in Figure 13 may be substituted for the plug and bleeder valve as desired.

As indicated in Figure 15, the choke assembly used in this manifold may be of the same general type as previously described, although certain improved features are illustrated. These features could likewise be incorporated in the chokes used with the preferred type of manifold. In Figure 15, the openings into the walls 36 and 38 of the manifold are bevelled as at 197 and thin sleeves of sealing metal 198 are fitted into the openings as shown, said sleeves having a flaring portion 199 which fits the bevel 197 and is interiorly engaged by the bevelled end 60 of the choke assembly. The interior of the choke retainer 200 is similarly modified, as compared

with the embodiment of Figure 8, having a tapered inner end 201 in which a flaring metal sealing sleeve 202 is positioned, said sleeve being pressed against the inner bevelled shoulder 72 on the choke bean. At the opposite end of the assembly, similar provision is made in the opening in the wall 38 to accommodate a flared metal sealing gasket or sleeve 204.

I have found that there is some tendency for the fluid leaving the choke bean at high velocity to wear away adjacent metal parts. For this reason, I have provided a relatively thick removable metal sleeve 206 in the interior of the choke retaining member 207 adjacent its outlet end. While the mounting of the choke bean is such that fluid is directed centrally through the outlet opening, any slight misalignment would cause the high velocity fluid to be directed against the walls of adjacent parts, and for this reason, it is advantageous to have the removable metal sleeve 206 to absorb any wear.

As shown both in Figures 14 and 15, the opposed walls 36 and 38 may be equipped with semicircular cradles 209 and 210 attached beneath the openings therein. These cradles make it possible to use only one wrench in attaching or removing the choke, and are convenient in supporting the choke while it is being expanded or contracted. For example, the cradle 210 may have a longitudinal slot therein (not shown) into which an extending portion 211 of the choke retainer 207 may fit, so that the cradle will hold the retainer 207 against movement while the cooperating retainer is being turned to expand or contract the choke as previously described.

The operation of the various embodiments disclosed herein will be understood from the description given, as well as from the specification of the Cullen Patent 2,043,428. Referring to Figure 4, and assuming that the well is flowing through the near passage which includes the choke C2, it will be understood that the valves V3 and V4 will be open while the valves V1 and V2 will be closed. In order to change the choke C2 which has been in use, valves V1 and V2 may be opened to initiate flow through the opposite passage of the manifold, after which valves V3 and V4 can be closed to isolate the choke C2. Preparatory to changing the choke, any pressure trapped between the two last-mentioned valves may be relieved by operation of the bleeder valve 132. With flow continuing through the passage which includes the choke C1, and with the opposite passage isolated, it is only necessary to apply a wrench to turn retainer 42 with respect to choke retainer 40 (Figure 8, and after loosening nut N), whereupon the whole choke assembly may be bodily removed from the manifold. An entire new assembly may be supplied in replacement, or the choke bean may be readily removed and replaced in the assembly, after which the simple wrench operation referred to will expand the assembly with the choke in position. It will be observed that there is no threading of parts, or otherwise connecting them, into special fittings in the manifold body. The connection and seal is simultaneously effected by simple expansion of the choke assembly. Of course, the operation of removing and replacing the choke is so simple that flow may be temporarily cut off through both passages while the change is being made. In the single wing embodiment of Figure 14, the change or inspection of the choke may be similarly accomplished by operation of the plug and bleeder valves, as will be apparent from the description. If an adjustable choke is employed, its needle valve may be replaced with facility after closing the appropriate plug valve, all as will be apparent from the description.

I claim:

1. A unitary manifold for use in flowing wells comprising a housing having means for attaching same to the tubing head of a well, said housing having a lower central inlet for the well fluid and an outlet for the fluid, and a pair of independent flow passages extending through said housing between said inlet and said outlet, each of said passages having a pair of stop valves therein, one valve of a pair being positioned adjacent said inlet and the other of the pair being positioned adjacent said outlet, each of said passages being interrupted between its valves by a cut-out in said housing, each of said cut-outs being defined by spaced opposed walls having openings therein which constitute the continuations of said passages as interrupted by said cut-outs, and a unitary and removable choke assembly positioned to bridge each of said cut-outs and having a channel of flow therethrough adapted to align at each end with said openings, said channel including a restricted choke portion, said choke assembly having means whereby it may be expanded lengthwise to wedge the assembly between said walls and having means at each of its ends for simultaneously forming seals around said openings at the opposite ends of said channel of flow by its lengthwise expansion.

2. A construction in accordance with claim 1 wherein the ends of said assembly have sealing surfaces to engage and form seals with packing around said openings by endwise pressure exerted by said assembly without threading the ends of said assembly into said openings.

3. A construction in accordance with claim 1 wherein said choke assembly is unconnected with said housing except by the pressure exerted against said walls by the endwise expansion of said housing.

4. A construction in accordance with claim 1 wherein said valves are of the rotary plug type having means for turning them between open and closed positions, said means extending from said housing on the same side thereof as the passage to be closed.

5. A manifold for use in flowing wells comprising a housing having means for attaching same to the tubing head of a well, said housing having an inlet thereto, an outlet therefrom and a flow passage for the well fluid extending through said housing between said inlet and said outlet, said passage being interrupted by a cut-out in said housing defined by spaced opposed walls of said housing having substantially aligned openings therein leading to the continuations of said passage, said walls having unthreaded sealing surfaces surrounding said openings, and a unitary and removable choke assembly positioned to bridge the cut-out space between said walls, said assembly comprising a flow bean and a carrier therefor, said carrier substantially surrounding and enclosing said flow bean to protect the latter, said flow bean having a restricted fluid-way therethrough adapted to be aligned with said openings, said carrier comprising cooperating choke retainers which are relatively and longitudinally movable in opposite directions away from one another to lengthen said assembly

in order to wedge the same between said walls, said assembly having unthreaded end surfaces which form seals by endwise pressure against said surfaces around the openings in said walls upon lengthening of said assembly, said assembly being removable as a unit upon shortening thereof by relative longitudinal movement of said carriers in the opposite direction toward one another.

6. A construction in accordance with claim 5 wherein said walls are provided with cradles to temporarily support said assembly in position between said openings while said choke retainers are being adjusted with respect to one another.

7. A manifold for use in flowing wells comprising a housing having means for attaching same to the tubing head of a well, said housing having an inlet thereto, an outlet therefrom and a flow passage for the well fluid extending through said housing between said inlet and said outlet, said passage being interrupted by a cut-out in said housing defined by spaced opposed walls of said housing having substantially aligned openings therein leading to the continuations of said passage, said walls having unthreaded sealing surfaces surrounding said openings, and a unitary and removable choke assembly positioned to bridge the cut-out space between said walls, said assembly comprising a flow bean and a surrounding carrier therefor, said flow bean having a restricted fluid-way therethrough adapted to be aligned with said openings, said carrier comprising a pair of hollow choke retainers which house the choke therein, said retainers being threaded to one another whereby said assembly may be shortened to a length less than the distance between said walls to remove the assembly from said manifold or elongated to a length greater than the distance between said walls to wedge said assembly between said walls, said assembly having unthreaded end surfaces which form seals by endwise pressure against said surfaces around the openings in said walls upon elongation of said assembly.

8. A construction in accordance with claim 7 wherein said walls are provided with cradles to support said assembly between said walls in alignment with the openings therein, and wherein one of said cradles and its cooperating retainer have means to lock said retainer against turning movement when the assembly is positioned, in order to elongate the assembly by turning movement of the other retainer.

9. A manifold for insertion into a flow line comprising a housing having an inlet and an outlet with a passage extending therethrough between said inlet and said outlet, said passage being interrupted by a cut-out in said housing defined by opposed walls spaced a fixed distance apart and having opposed openings therein which lead to the continuations of said passage, said walls having unthreaded sealing surfaces surrounding said openings, and a unitary removable choke assembly comprising a carrier and a choke bean therein adapted to bridge the space between said walls and complete said passage, said carrier comprising a pair of choke retainers having adjustable connecting means operable to shorten the length of the assembly to less than the distance between said walls in order to remove the assembly as a unit from the manifold, said connecting means being operable to increase the length of the assembly to a dimension greater than the distance between said walls to wedge said assembly between said walls.

10. A construction in accordance with claim 9 wherein said assembly has unthreaded sealing surfaces at each end to seal with the surfaces surrounding the openings in said walls when the length of said assembly is increased.

11. A construction in accordance with claim 9 wherein said flow bean has an enlarged head which protrudes from one end of said assembly and is engaged by one of said retainers when the assembly is lengthened and is forced thereby into contact with the sealing surface surrounding the opening in one of said walls, said other retainer having an unthreaded sealing surface at the opposite end of said assembly which is forced against the sealing surface surrounding the opening in the other of said walls when said assembly is lengthened.

12. A choke assembly for insertion and removal as a unit between fixed walls having aligned openings therein, comprising a flow bean of less length than the distance between the walls, and a carrier formed to support said flow bean therein and to complete an enclosed passage between said walls formed in part by said flow bean, said carrier comprising a pair of choke retainers each of which surrounds said flow bean, said retainers being adjustably connected to one another to lengthen said assembly to a dimension greater than the distance between said walls or shorten it to a dimension less than the distance between said walls, one of said retainers having an end opening with a smooth sealing surface surrounding the same to engage and seal with one of said walls around its opening by endwise pressure when said assembly is lengthened.

13. A choke assembly for insertion and removal as a unit between spaced fixed manifold walls having aligned openings therein, comprising a flow bean of less length than the distance between the walls, said flow bean comprising an enlarged head having outer and inner sealing surfaces and a tubular open end portion extending inwardly from said head, a carrier formed to support said tubular portion of the flow bean therein comprising a pair of retainers with adjustable connecting means operable to lengthen or shorten the carrier, one of said retainers having an end surface to engage and seal with said inner sealing surface of said head, the other of said retainers having a smooth sealing surface at the opposite end of said carrier to engage and seal with one of said manifold walls around the opening therein by endwise pressure, operation of said connecting means to lengthen the carrier serving to force the outer sealing surface of said head into sealing engagement with the opposite manifold wall around its opening, said carrier having means forming a closed chamber around the open end of said choke bean.

14. A manifold of the class described, comprising a housing having a passage therethrough between an inlet and an outlet, said housing having a cut-out defined by spaced walls interrupting said passage, a hollow removable choke assembly bridging the space between said walls and thereby completing said passage, said assembly including a flow bean with a restricted bore therethrough, the passage in said housing leading to the inlet end of said bore having an opening through the outer wall of said housing, and an adjustable choke needle mounted in said opening, said needle having a pointed valve end entering the bore of said flow bean and having an operating end extending beyond the outer wall of said housing.

15. A construction in accordance with claim 14 wherein said housing and the operating end of said choke needle have cooperating adjustable

means with indicia thereon to indicate the position of the valve end of said needle with respect to the inlet of said flow bean.

16. A choke bean comprising an elongated tubular member having a restricted axial passage of uniform diameter extending entirely therethrough, said bean having an integral enlarged head at one end thereof having an external cylindrical peripheral surface of greater diameter than the main tubular portion of said bean and inwardly tapering circular sealing surfaces at the outer and inner ends of said cylindrical surface, the exterior surface of said flow bean being smooth throughout.

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