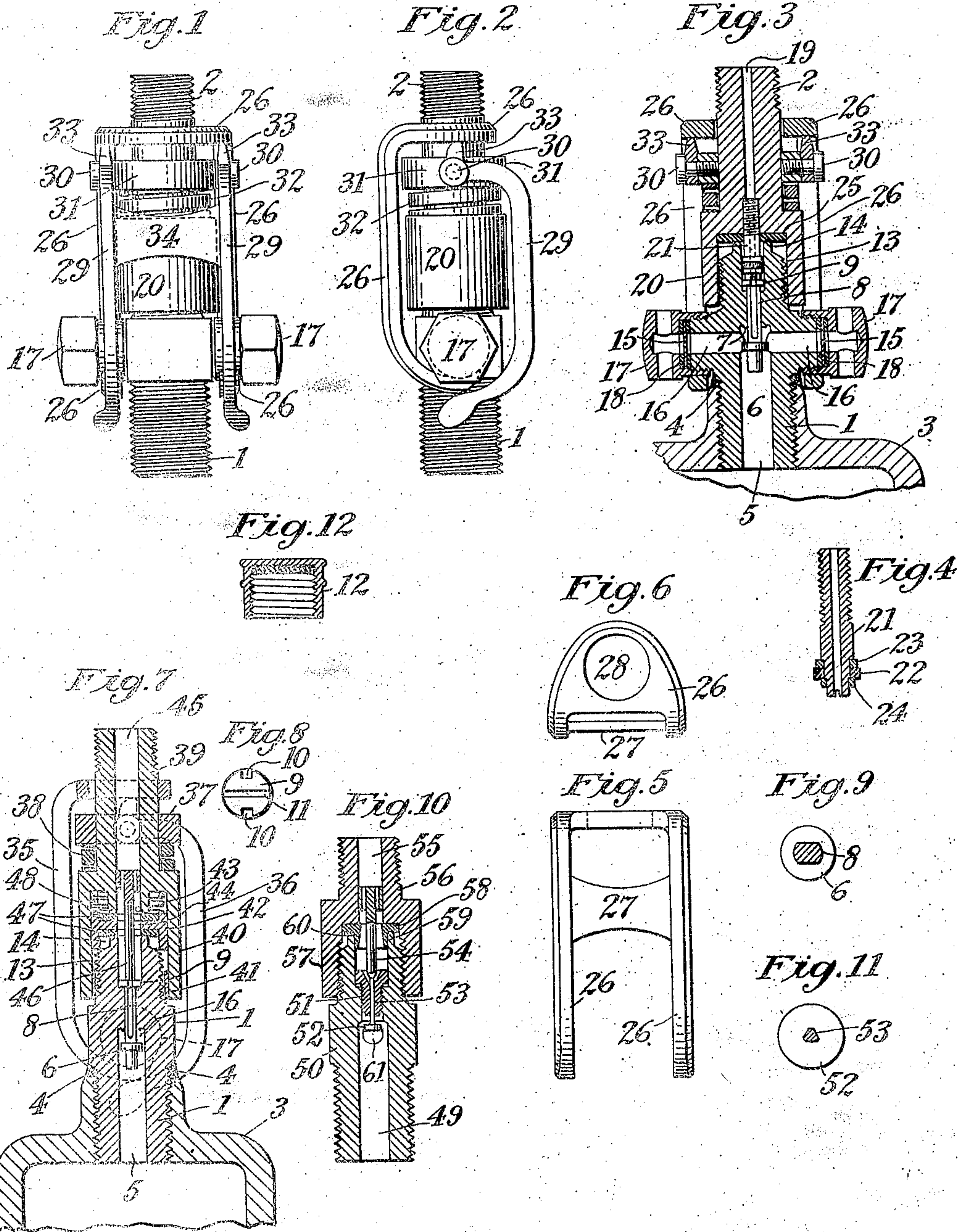


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C. J. COLEMAN.
FLUID TRANSFERRING CONNECTOR.

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UNITED STATES PATENT OFFICE.

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FLUID-TRANSFERRING CONNECTOR.

No. 864,079.

Specification of Letters Patent.

Patented Aug. 20, 1907.

Application filed December 18, 1906. Serial No. 348,405.

To all whom it may concern:

Be it known that I, CLYDE J. COLEMAN, a citizen of the United States, residing at the city of New York, borough of Manhattan, in the county of New York and State of New York, have invented certain new and useful Improvements in Fluid-Transferring Connectors, of which the following is a specification, reference being had therein to the accompanying drawing, forming a part thereof.

My invention relates to connectors or coupling devices for drawing off or transferring fluids from a suitable source to a point of use, as, for instance, from tanks or containers charged with acetylene or carbon dioxide, and has for its general objects simplicity of construction and effectiveness of operation, and has as one of its particular objects the avoidance of the necessity of any valve as a fixture upon the tank other than the usual check-valve, and the avoidance of loss or leakage during the operation of attaching a detachable member of the connector to a fixed portion thereof secured to the source of fluid.

Other objects will appear from the following description.

My invention includes means actuated by the pressure of the fluid being transferred for pre-sealing or uniting together in a fluid-tight manner the passages of the detachable and fixed parts of the connector before they have been drawn tightly together to effect a final sealing.

My invention includes an improved arrangement of bursting disks in the fixed part of the connector and clamping means to draw the two connector parts together, these clamping means being carried by the detachable or coupling part of the connector and being engageable with the retaining caps of the bursting disks, and my invention also includes various improvements in the construction and combination of parts.

As my invention may be carried out in various constructions, in the accompanying drawing I have illustrated several such constructions and have claimed all broadly and a preferred form specifically.

The embodiments of my invention shown in the accompanying drawing will now be particularly described after which I will point out my invention in claims.

Figure 1 is a side elevation of one form of the connector. Fig. 2 is an end elevation thereof as viewed from the left in Fig. 1. Fig. 3 is a longitudinal central vertical section viewed in the same direction as Fig. 1, and showing the connector as attached to a container, a portion only of which is shown. Fig. 4 is an enlarged central vertical section of the hollow valve-opening pin and of the pre-sealing piston carried thereby shown in elevation in Fig. 3. Fig. 5 is an elevation of the divided attaching-hook of clamp-member carried by the coupling or removable part of the connector and engageable

with the plug or fixed connector part, such hook appearing in this figure as it would when viewed from the left of Fig. 2. Fig. 6 is a plan view of what is shown in Fig. 5. Fig. 7 is a central vertical section of the preferred form of connector, and shows the same as attached to a container the upper part only of which is shown. Fig. 8 is an enlarged plan view of the check-valve shown in elevation in Figs. 3 and 7, and shows merely the head thereof. Fig. 9 is a plan on an enlarged scale of the check-valve seen in Figs. 3 and 7, with the stem thereof in cross-section. Fig. 10 is a central vertical section of a modified construction. Fig. 11 is a plan on an enlarged scale of the check-valve illustrated in elevation in Fig. 10, with the stem thereof in cross-section. Fig. 12 is a central vertical section of a screw cap which may be used to close and seal the container by screwing upon the fixed connector part or plug when the coupling member has been detached.

In the embodiment of the invention illustrated in Figs. 1, 2 and 3 of the accompanying drawings, a connector is shown comprising a fixed or plug member 1 and a detachable member or coupling 2, these members constituting coacting conduit parts.

The connector may be employed for transferring fluids under pressure between any two points, but is more particularly intended for use upon containers or tanks within which a fluid is stored under high pressure for transportation. To illustrate this use as a practical application of the invention, such a container 3, with unnecessary portions broken away, is shown as having the plug 1 permanently attached or secured thereto and virtually forming a part thereof. The plug 1 may be attached to the container 3 in any manner desired, but is shown as screwed thereto and also further secured by solder 4.

The plug 1 has a passage or bore 5 extending longitudinally therethrough, this bore being controlled by a closure consisting of an inwardly opening check-valve 6 located therein and for which is provided a seat 7, and this valve is normally closed to prevent escape of fluid from the container 3. The valve 6 has a stem 8 guided in a reduced portion of the bore 5 and provided with a head 9, the valve-stem being flattened as shown most clearly in Fig. 9 to provide passages for the fluid, and the valve-stem-head having notches 10 for the same purpose, the head 9 being also shown as provided with a transverse groove 11 merely for the use of a screw driver in attaching the valve-stem to the valve proper.

To further guard against any possible leakage, and to protect the outer end of the plug 1 from injury during transportation, a screw-cap 12 is provided, screwed down over the threads 13, provided solely for that purpose, and down tightly upon the seat 14.

As a means of safety, bursting-disks 15 are provided for the fixed member or plug 1 and cover the ends of a

transverse passage or counter-bore 16 which intersects the main bore at a point inwardly from the seat of the check-valve 6, these bursting disks being held in place by perforated screw-caps 17 and interposed gaskets 18.

5 The projecting screw-caps 17 serve also an additional purpose, as will presently appear.

The detachable member or coupling 2 has a fluid-transmitting passage or bore 19 which registers with the similar bore 6 of the fixed member 1 when the two
10 members or parts are brought into proper juxtaposition, the member 2 being provided with an enlargement or guiding sleeve 20 which slides over the threaded outer end of the fixed member 1.

The opening device or means for automatically forcing open the check-valve 6 coincident with the coupling together of the two coacting conduit parts of the connector, comprise a valve-opening pin 21 carried by the coupling 2 and shown as screwed into the inner end of its bore 19. The valve-opening pin is shown as hollow or as having a longitudinal bore to provide a passage therethrough for the fluid being transferred. While the coupling 2 is still approaching the plug 1 the free end of the pin 21 will enter the bore 5 and come in contact with the head 9 of the check-valve 6 and push
25 open the check-valve against the fluid pressure. As the coacting parts of the connector have not yet been brought entirely together to effect a final sealing, as explained hereinafter, there would result a loss of contained fluid during the connecting operation were not
30 some means provided to prevent this, such means being very aptly termed pre-sealing means or preliminary sealing means.

The preliminary sealing or pre-sealing means provided in the construction now being described, comprise a pre-sealing piston carried upon the free end of the valve-opening pin 21 and piston-head 22 of yielding resilient material, such as soft rubber held in place between two annular retaining disks, a larger disk 23 at the back and a disk 24 of smaller diameter at the
40 front or nearest to the free end of the pin 21. In operation this pre-sealing piston closely fits in the somewhat reduced portion of the bore 5 just inward from the seat 14 at the outer end of the plug 1. As soon as the pressure of the fluid comes upon the pre-sealing piston,
45 due to the opening of the check-valve 6, such pressure, owing to the partial exposure of the front surface of the piston-head 22 resulting from the small diameter of the annulus 24 and the support at the rear by the larger annulus 23, will cause the substance of the piston head
50 to be flattened and expanded against the walls of its containing bore so as to effect a secure preliminary sealing together of the fluid-transmitting bores of the coacting conduit parts of the connector, the preliminary sealing means therefore being actuated by the pressure of the fluid.

An additional and final sealing is effected by a sealing disk 25, carried by the coupling member 2 at the bottom of its enlarged portion 20, which is pressed down upon the seat 14 at the end of the fixed member 1,
60 when the coacting connector members are brought entirely together. This sealing disk may be of celluloid. The above-described final sealing means are actuated by the means for drawing the connector parts together and which will now be described.

65 The means for drawing together the connector mem-

bers 1 and 2, to first open the check-valve 6 and effect a pre-sealing, and then to effect a final sealing, comprise a divided hook 26 having two hooked prongs, as shown, braced by an integral tie 27. The hook 26 is carried by the coupling member 2 and has a slidable connection
70 therewith by reason of the fact that the upper end of the member 2 passes loosely through an opening or eye 28 in the supporting end or heel of the hook, such heel being bent over at right angles as shown. The two curved prongs of the hook 26 engage with the bursting-disk retaining-caps 17 by being swung therebeneath when the guide-sleeve 20 of the member 2 passes over the outer end of the member 1. To draw the coacting connector members firmly together to effect a final sealing, a cam-lever 29 is provided which is pivoted by pivot-screws
80 30 to diametrically opposite points on a thrust-ring 31 slidable upon the member 2. A coiled thrust-spring 32 encircles the member 2 and is interposed between the shoulder thereon formed by the enlarged portion 20 and the thrust-ring 31. The cam-lever 29 is provided with
85 cam-toes 33 for engaging with the heel of the hook 26 to put the spring 32 under tension and draw the two coacting connector members toward each other when the cam-lever 29 is brought substantially parallel thereto, as may be seen in the drawings. The cam-lever 29 is
90 divided into two parts as shown, the two sides or parts being held together as one by the integral tie or brace 34. The handle ends of the cam-lever are curved inward as shown to guard against accidental displacement and to give a neat and finished appearance.
95 When the connector members 1 and 2 are drawn entirely together by the tension of the thrust-spring 32, the sealing disk 25 will be pressed down upon the seat 14 to effect a final sealing.

The two parts of the connector may be disconnected
100 from each other by an operation the reverse of that above described, the pressure of the contained fluid, if any, then acting to close the check-valve 6.

The preferred embodiment of my invention, illustrated in Fig. 7, will now be described. This could not
105 so well be done at first because many of the details of construction which are identical or substantially so are more clearly and completely shown in the drawings just described. The principle of operation is the same throughout, but in the preferred construction the pre-
110 sealing piston is of a different and it is thought more efficient and more durable construction.

In the construction shown in Fig. 7 the fixed connector member and all parts affixed thereto and carried thereby are exactly identical with what is shown in
115 Figs. 1, 2 and 3, and therefore this member and its parts may be considered as one and the same in Figs. 1, 2, 3 and 7, and should therefore be designated by the same numerals. For example, it might be specifically remarked that this designation applies likewise to the
120 check-valve. In fact it may be simply considered that the coupling or detachable connector member 2 (of Figs. 1, 2 and 3) has been removed or disconnected and that a detachable coupling member of the now-to-be-described preferred construction has been connected
125 to the same fixed member.

In the construction shown in Fig. 7 the connecting hook 35, cam-lever 36, thrust ring 37 and thrust spring 38 are all of substantially the same construction as above described, the only difference being that the
130

hook and the lever are slightly longer, and operate in precisely the same manner as just described, and therefore need no further description now.

The detachable connector member or coupling 39 has an enlarged or sleeve portion 40 which acts as a guide by slipping down over the threads 13 at the outer end of the fixed member or plug 1 the same as in the case of the enlargement 20 of the corresponding connector member 2.

10 The open end of the sleeve 40 is provided with an annular lining or bushing 41 which is fixed therein and acts as an abutment or stop to limit the outward movement of the pre-sealing piston 42 which is ground to slide in the sleeve with a close fluid-tight fit. The pre-sealing piston 42 is normally thrust outward by a coiled spring 43 located back thereof within the sleeve 40, this spring always maintaining the pre-sealing piston at its sealing position. The spring 43 accomplishes this last-named function by always 20 keeping the piston pushed out against its stop 41 and therefore always in a position to make a sealing contact with the seat 14 at the outer end of the connector member 1 previously to the opening of the check-valve 6. The spring 43 also to some slight extent 25 assists in the sealing effect, but this is only incidental and the fluid pressure is depended upon to effect an effective pre-sealing. The piston 42 is provided with a central aperture 44 which coincides with the registering bores 5 of the plug 1 and 45 of the coupling 39, this opening providing both a passage for the fluid and space for the valve-opening pin 46. This valve-opening pin has an enlargement at one end which is rigidly fixed in the bore 45 of the coupling member 39, the enlarged part of the pin having openings 35 therethrough forming fluid passages as shown. The pre-sealing piston 42 is provided on its opposite faces with annular sealing rings 47 which may be of celluloid. When the check-valve 6 has been pushed open by the pin 46, the piston 42 now being in contact with 40 the seat 14 by reason of the spring 43, the fluid under pressure will pass from the container 3 through the bore 5 and piston opening 44 to the farther or, as shown, upper side of the piston 42 and press the piston firmly down upon the seat 14, and as the piston has 45 a fluid-tight fit in the sleeve 40 all possibility of leakage during the connecting or coupling operation is obviated.

To effect a final sealing, the coupling member 39 is provided with a seat 48 which, when the coacting conduit connector members 1 and 39 have been brought to their limit of approach toward each other by the cam-lever 36, seats down upon the piston 42 and the piston is then gripped between the seats 14 and 48 in a fluid-tight manner to effect a final sealing.

55 The modification shown in Fig. 10 remains to be described. In this construction the bore 49 of the fixed connector member 50 has a somewhat reduced threaded portion in which is screwed a valve-holding plug 51 which carries the check-valve 52 and provides a seat therefor. The stem 53 of the valve 52 is 60 triangular in cross section, as may be seen in Fig. 11, to provide passages alongside thereof for the fluid. This valve stem has a tapered head at its outer end as shown, this head preventing the valve from dropping out and also providing a contact surface for the

valve-opening pin 54. The valve-opening pin is fixed in the bore 55 of the coupling member 56 by an enlarged portion on the pin having therein fluid passages as shown. In this construction the enlarged or sleeve portion 57 of the detachable member 56 is 70 provided with internal screw threads which engage, as shown, with the screw threads upon the outer end of the fixed member 50 to draw the two members together to effect first the opening of the check-valve and the resultant preliminary sealing, and then 75 a final sealing. In this construction the pre-sealing piston is fixed at the bottom of the sleeve 57 and comprises a flange portion 58 and a tubular flaring portion 59. This piston is made of some slightly yielding and resilient material such as semi-hard 80 rubber. When the check-valve 52 is pushed open by the valve-opening pin 54, the flaring portion of the piston then having entered the upper portion of the bore 49 of the member 50, the pressure of the fluid will force the yielding piston walls outward 85 into firm and fluid-tight contact with the surrounding bore, resulting in effective pre-sealing before the two connector members have been drawn entirely together to effect a final sealing. Later the final sealing takes place by reason of the flange portion 90 58 of the piston being pressed down upon the seat 60 at the outer end of the fixed member 50 as the screw threads carried thereby bring the two connector members completely together. In this construction it is of course necessary to rotate the connector members 95 50 and 56 relatively to each other to form the screw connection as described. A reverse rotation disconnects the members and permits the check valve 52 to close, after which the cap 12 may be applied to the member 50 as in the previously described constructions. The fixed or plug member 50 is provided with a counter-bore 61 for the application of bursting-disks in the same manner as in the other constructions.

In all of the figures of the drawing the two coacting connector members are shown as having been drawn entirely together to effect a final sealing together of their bores with the check-valve open.

It is obvious that various modifications may be made in the constructions shown and above particularly described within the principle and scope of my invention.

I claim:—

1. A fluid-transferring connector comprising coacting conduit parts having passages adapted to communicate with each other when the parts are joined, means for drawing these parts toward each other, a closure for the passage in one of the parts, an opening device in the other part adapted to open such closure when the parts are brought near enough together, and preliminary sealing means actuated by the pressure of the fluid when the closure is opened and coacting with the two parts to unite their passages in a fluid-tight manner before the two parts are brought to their limit of approach to each other.

2. A fluid-transferring connector comprising coacting conduit parts having passages adapted to communicate with each other when the parts are joined, means for drawing these parts toward each other, a closure for the passage in one of the parts, an opening device in the other part adapted to open such closure when the parts are brought near enough together, preliminary sealing means actuated by the pressure of the fluid when the closure is

opened and coacting with the two parts to unite their passages in a fluid-tight manner before the two parts are brought to their limit of approach to each other, and final sealing means actuated by the means for drawing the parts toward each other when the parts have been drawn to their limit of approach toward each other.

3. A fluid-transferring connector comprising coacting conduit parts having passages adapted to communicate with each other when the parts are joined, means for drawing these parts toward each other, a closure for the passage in one of the parts, an opening device in the other part adapted to open such closure when the parts are brought near enough together, and a pre-sealing piston coacting with the two parts and actuated by the pressure of the fluid when the valve is opened to seal the passages of the parts together in a fluid-tight manner before the two parts have been drawn to their limit of approach toward each other.

4. A fluid-transferring connector comprising coacting conduit parts having passages adapted to communicate with each other when the parts are joined, means for drawing these parts toward each other, a closure for the passage in one of the parts, an opening device in the other part adapted to open such closure when the parts are brought near enough together, a pre-sealing piston coacting with the two parts and actuated by the pressure of the fluid when the valve is opened to seal the passages of the parts together in a fluid-tight manner before the two parts have been drawn to their limit of approach toward each other, and final sealing means actuated by the means for drawing the parts toward each other when the parts have been drawn to their limit of approach toward each other.

5. A fluid-transferring connector comprising coacting conduit parts having passages adapted to communicate with each other when the parts are joined, a cam lever for drawing these parts toward each other, a closure for the passage in one of the parts, an opening device in the other part adapted to open such closure when the parts are brought near enough together, and preliminary sealing means actuated by the pressure of the fluid when the closure is opened and coacting with the two parts to unite their passages in a fluid-tight manner before the two parts are brought to their limit of approach to each other.

6. A fluid-transferring connector comprising coacting conduit parts having passages adapted to communicate with each other when the parts are joined, a cam-lever for drawing these parts towards each other, an interposed spring for receiving the thrust of the cam-lever, a closure for the passage in one of the parts, an opening device in the other part adapted to open such closure when the parts are brought near enough together, preliminary sealing means actuated by the pressure of the fluid when the closure is opened and coacting with the two parts to unite their passages in a fluid-tight manner before the two parts are brought to their limit of approach to each other, and final sealing means actuated by the means for drawing the parts toward each other when the parts have been drawn to their limit of approach toward each other.

7. A fluid-transferring connector comprising a fixed plug, a coupling coacting therewith, the plug and the coupling having communicating passages, a closure for the passage of the plug, a counter-passage intersecting the passage of the plug inwardly from the closure, bursting-disks closing the outer ends of the counter-passage, perforated caps retaining the bursting-disks in place, and means carried by the coupling and engageable with the caps for drawing the coupling and the plug toward each other.

8. A fluid-transferring connector comprising a fixed plug, a coupling coacting therewith, the plug and the coupling having communicating passages, a closure for the passage of the plug, a counter-passage intersecting the passage of the plug inwardly from the closure, bursting-disks closing the outer ends of the counter-passage, perforated caps retaining the bursting-disks in place, means carried by the coupling and engageable with the caps for drawing the coupling and the plug toward each other, an opening device in the coupling and for opening the closure in the

plug when the coupling and the plug are brought near enough to each other, and pre-sealing means coacting with the coupling and the plug and actuated by the pressure of the fluid when the valve is opened to seal the passages together in a fluid-tight manner before the coupling and the plug have been drawn to their limit of approach toward each other.

9. A fluid-transferring connector comprising a fixed plug, a coupling coacting therewith, the plug and the coupling having communicating passages, a closure for the passage of the plug, a counter-passage intersecting the passage of the plug inwardly from the closure, bursting-disks closing the outer ends of the counter-passage, perforated caps retaining the bursting-disks in place, means carried by the coupling and engageable with the caps for drawing the coupling and the plug toward each other, an opening device in the coupling and for opening the closure in the plug when the coupling and the plug are brought near enough to each other, pre-sealing means coacting with the coupling and the plug and actuated by the pressure of the fluid when the valve is opened to seal the passages together in a fluid-tight manner before the coupling and the plug have been drawn to their limit of approach toward each other, and final sealing means actuated by the means for drawing the coupling and the plug together when the coupling and the plug have been drawn to their limit of approach toward each other.

10. A fluid-transferring connector comprising coacting conduit parts having passages adapted to communicate with each other when the parts are joined, means for drawing these parts toward each other, a closure for the passage in one of the parts, an opening device in the other part adapted to open such closure when the parts are brought near enough together, a pre-sealing piston coacting with the two parts and actuated by the pressure of the fluid when the valve is opened to seal the passages of the parts together in a fluid-tight manner before the two parts have been drawn to their limit of approach toward each other, and a spring for maintaining the pre-sealing piston at its sealing position.

11. A fluid-transferring connector comprising coacting conduit parts having passages adapted to communicate with each other when the parts are joined, means for drawing these parts toward each other, a closure for the passage in one of the parts, an opening device in the other part adapted to open such closure when the parts are brought near enough together, a pre-sealing piston coacting with the two parts and actuated by the pressure of the fluid when the valve is opened to seal the passages of the parts together in a fluid-tight manner before the two parts have been drawn to their limit of approach toward each other, a spring for maintaining the pre-sealing piston at its sealing position, and final sealing means actuated by the means for drawing the parts toward each other when the parts have been drawn to their limit of approach toward each other.

12. A fluid-transferring connector comprising a fixed plug, a coupling coacting therewith, the plug and the coupling having communicating passages, an inwardly opening check-valve in the passage of the plug, a counter-passage intersecting the passage of the plug inwardly from the valve, bursting disks closing the outer ends of the counter-passage, perforated retaining caps holding the bursting-disks in place, a divided attaching hook mounted to slide upon the coupling and capable of engaging with the retaining caps, a thrust-ring slidably mounted upon the coupling, a thrust-spring interposed between the ring and the coupling, and a cam-lever pivoted upon the ring and engageable with the hook to draw the plug and the coupling toward each other by putting the spring under tension.

13. A fluid-transferring connector comprising a fixed plug, a coupling coacting therewith, the plug and the coupling having communicating passages, an inwardly opening check-valve in the passage of the plug, a counter-passage intersecting the passage of the plug inwardly from the valve, bursting-disks closing the outer ends of the counter-passage, perforated retaining caps holding the bursting-disks in place, a divided attaching hook mounted to slide upon the coupling and capable of engaging with

the retaining caps, a thrust-ring slidably mounted upon the coupling, a thrust-spring interposed between the ring and the coupling, a cam-lever pivoted upon the ring and engageable with the hook to draw the plug and the coupling toward each other by putting the spring under tension, a valve-opening projection carried by the coupling, for pushing open the valve when the coupling and the plug are brought near enough to each other, a pre-sealing piston carried by the coupling and fitting therein and having a passage communicating therewith, and a spring for holding the pre-sealing piston at its pre-sealing position when the valve is opened, the pre-sealing piston being arranged to be actuated by the fluid pressure to pre-seal the passages of the plug and the coupling together in a fluid-tight manner before the plug and the coupling have reached their limit of movement toward each other, the plug and the coupling each being provided with valve-seats for clamping the pre-sealing piston therebetween to produce a final seal between the plug and the coupling.

14. A fluid-transferring connector comprising coaxing conduit parts having passages adapted to communicate

with each other when the parts are joined, means for drawing these parts toward each other, a closure for the passage in one of the parts, an opening device in the other part adapted to open such closure when the parts are brought near enough together, a pre-sealing piston carried by one of the parts and fitting therein and having a passage therethrough communicating with the passage of the two parts when such parts are joined, and a spring for holding the pre-sealing piston at its pre-sealing position when the valve is opened, the conduit parts being provided with seats for clamping the pre-sealing piston therebetween to produce a final seal between the conduit parts when those parts have been drawn substantially to their limit of approach toward each other.

In testimony whereof I have affixed my signature in presence of two witnesses.

CLYDE J. COLEMAN.

Witnesses:

WM. ASHLEY KELLY,
BERNARD COWEN.