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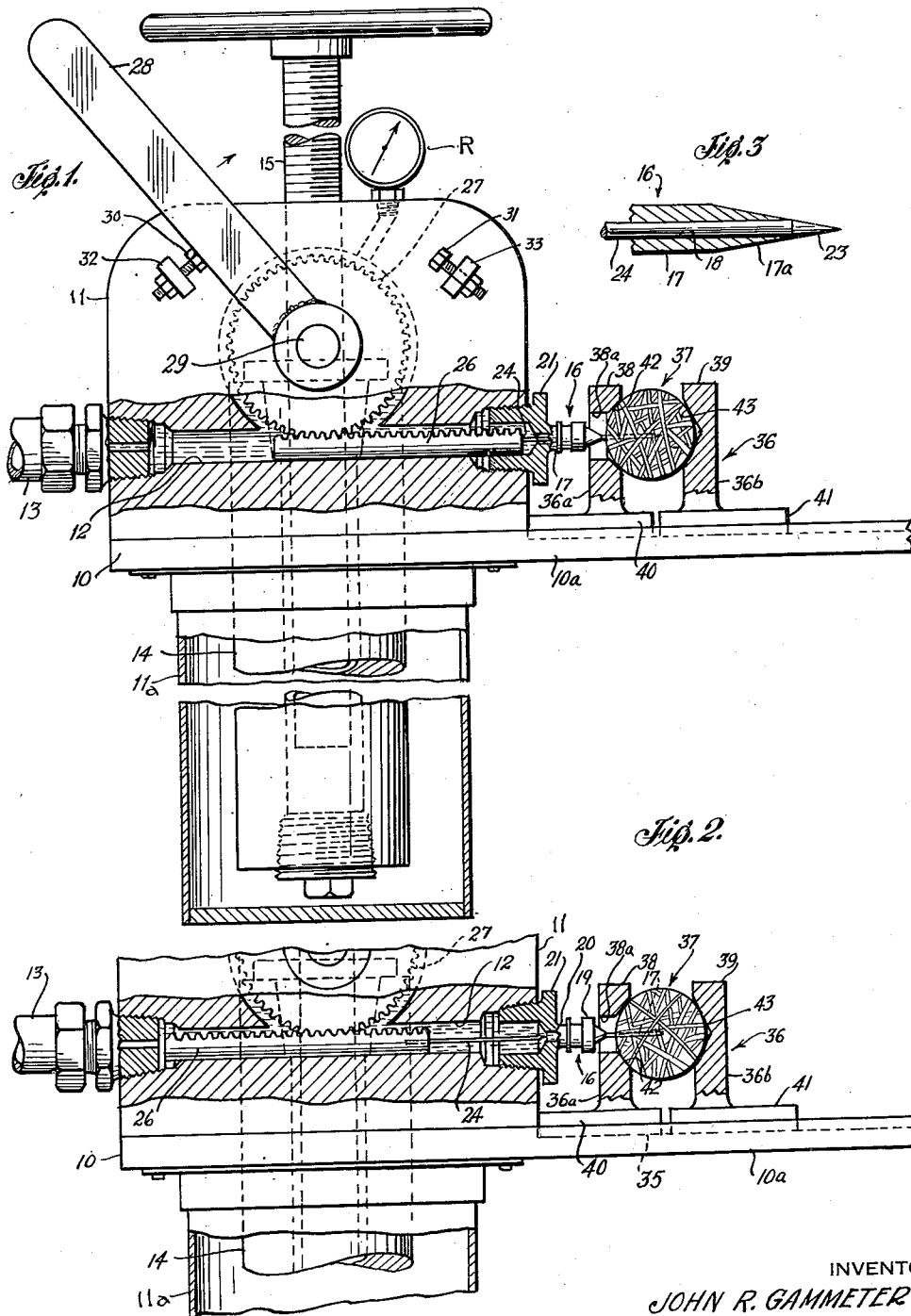
J. R. GAMMETER

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VALVULAR DEVICE FOR FLUID-INJECTING GOLF BALL CENTERS

Filed May 10, 1947

2 Sheets-Sheet 1



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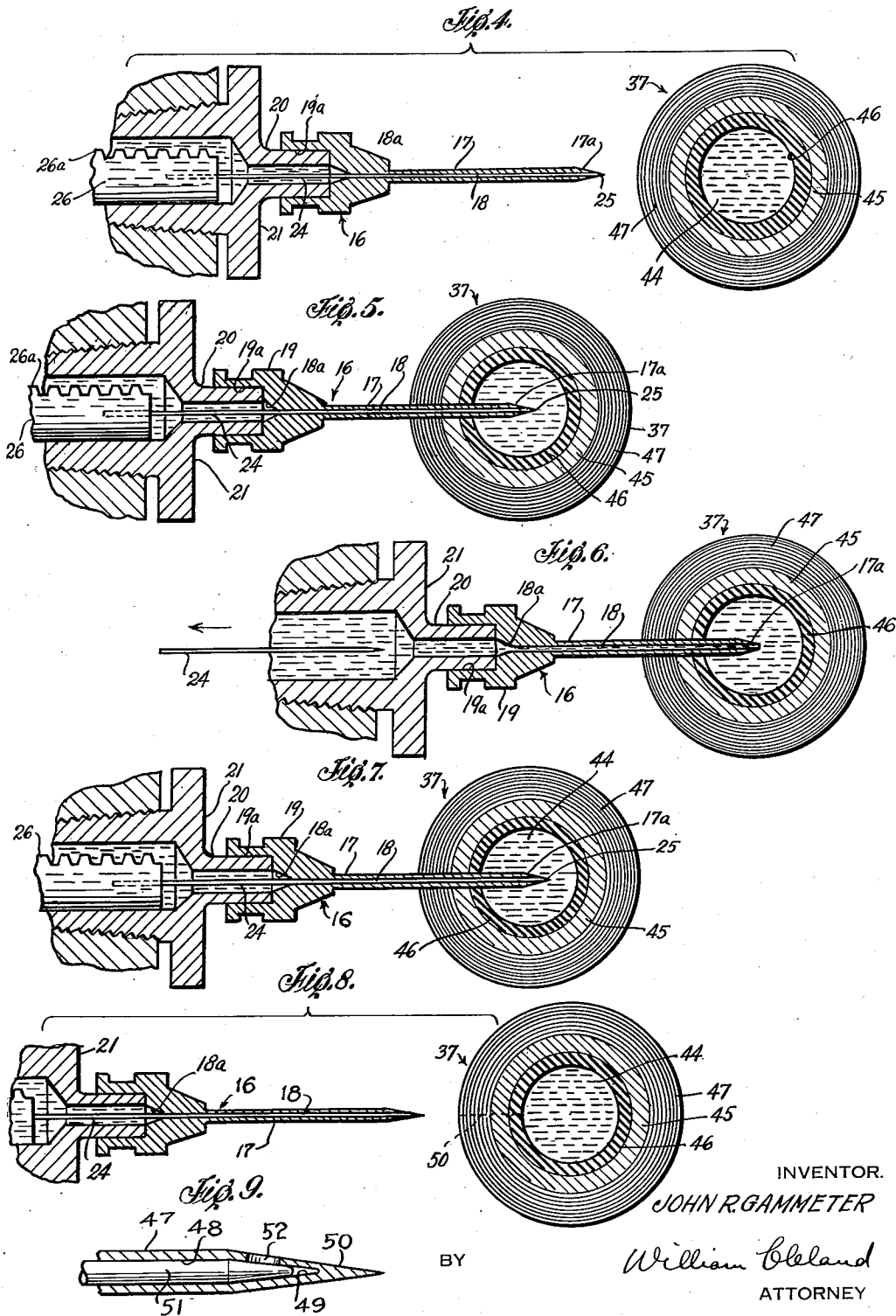
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2 Sheets-Sheet 2



UNITED STATES PATENT OFFICE

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VALVULAR DEVICE FOR FLUID-INJECTING
GOLF BALL CENTERSJohn R. Gammeter, Akron, Ohio, assignor to The
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11 Claims. (Cl. 154-18)

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This invention relates to a device for fluid-injecting golf ball centers.

At present, there are in use a number of methods of fluid-injecting golf ball centers, utilizing hollow injection needles in the nature of hypodermic needles. Two such methods are described in prior Gammeter patents, Numbers 1,167,396 and 2,225,213. The injection fluid may be of known type, such as glue-glycerine-formaldehyde printing roller composition, capable of being forced through the injection needle. In both said prior Gammeter patents, for example, injection fluid under heavy pressure, is utilized to apply super-tension to elastic thread windings on the inner shells of golf balls, it being a well known fact that the rubber threads, once super-tensioned, are thereafter relaxed and remain less stretchable under the impact of the completed balls with a golf club head, and the balls, therefore, tend more effectively to recover rebound and normal shape after such impact. In the past, however, it has been found that in the use of the ordinary hollow type of fluid injection needle, there is a tendency for the injection fluid to follow the needle, or to ooze from the hollow thereof, as it is withdrawn from an injected ball or ball casing, and fluid may thus become lodged in the puncture made by needle and result in a substantial percentage of defective articles. In a similar manner fluid remaining within the hollow of the needle frequently causes clogging of the same.

One object of the present invention is to provide an improved fluid-injecting means of the character described, including a hollow stem for passage therethrough of injection fluid, and means for preventing return flow of fluid into the hollow of the stem, whereby is eliminated or greatly minimized the number of rejections caused by fluid leaking from the needle into the small puncture made in the ball or ball casing by the needle, as the needle is withdrawn, and whereby is obviated the usual clogging of injection fluid within the hollow of the needle.

Another object of the invention is to provide a fluid injection needle of the character described, including improved means therein in the nature of a valve, operable at the extreme tip end of the needle, and therefore operable entirely within the cavities of balls or ball casings being injected with such fluid.

These and other objects of the invention will be manifest from the following brief description and the accompanying drawings.

Of the accompanying drawings:

Figure 1 is a side elevation, partly broken away and in section, of the fluid-injecting needle and apparatus for operating the same, the needle and operating parts thereof being illustrated in a needle-closed position.

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Figure 2 is a view similar to Figure 1, but further broken away and illustrating the needle and associated parts in a needle-open position.

Figure 3 is a greatly enlarged fragmentary cross-section, of the tip end of the improved injection needle embodying the features of the invention.

Figures 4 to 8, inclusive, are enlarged fragmentary cross-sections of the injection needle and a part of the operating structures therefor, in association with a golf ball casing, and in various progressive stages of use of the device for injecting fluid into the casing.

Figure 9 is greatly enlarged fragmentary cross-section, similar to Figure 3, of the tip end of a modified form injection needle.

Referring particularly to Figures 1 and 2, there is illustrated a support 10 on which is mounted a suitable housing 11, having a chamber 12 therein connecting, through a conduit 13, with a suitable pressure cylinder 14 containing injection fluid. The pressure of the fluid may be manually controlled, as by means of a screw 15, and as indicated on a pressure regulator dial R, of known type, operatively communicating with fluid chamber 12 as shown (see Figure 1). Essential parts of the apparatus may be steam jacketed as at 11a, or in any suitable manner, to maintain the fluid supply in desired fluid condition.

Attached to housing to project freely therefrom, may be an injection needle device 16, including an elongated needle-like stem 17 having a cylindrical central opening 18 extending longitudinally therethrough, and an enlarged head 19 provided with a bore 19a for reception of a reduced neck 20 of a cap 21, which is threaded into the housing 11 in a manner to communicate the stem opening 18 with the chamber 12. Head 19 may be secured onto neck 20 by any suitable means, such as by sweating it on with solder. Reciprocally received through the stem opening 18 may be an elongated core 24, the outer end of which normally projects from the end of the stem 17, as indicated at 25, and which is tapered or pointed to blend smoothly with the tapered portion 17a of the stem (see Figure 3). For facilitating reception of core 24 in stem opening 18, a conical recess 18a is provided on the inner face of head 19. The inner end of the core 24 is connected to a rack 26 of the same diameter as the chamber 12, to be longitudinally slidable therein, the reduction of the upper side of the rack to provide teeth 26a providing requisite space within said chamber for free passage of pressure fluid therethrough, from the conduit 13 to the injection needle device 16.

Rotatably mounted in housing 11 may be a pinion 27, in meshing engagement with the rack 26, a handle 28 provided on an outward extension of a shaft 29 of the pinion being operable

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between angularly disposed stops 30 and 31, for limiting swinging movement of the handle which, through the pinion 27, will reciprocate the rack to move the core 24 between a closed position in which the hollow stem is completely closed thereby (see Figures 1, 3, 4, 5, 7 and 8), and a fully opened position in which the core is withdrawn from the stem to allow passage of fluid therethrough from the chamber 12 (see Figures 2 and 6). The stop members 30 and 31 are shown as screws adjustably threaded in lugs 32 and 33 on the housing 11, whereby the open and closed positions of the core 24 with respect to the stem may be accurately determined.

A movable ball-supporting member 36 is provided for retaining a ball or ball casing 37 in association with the injection needle device 16, during fluid-injection steps to be described later. To this end, member 36 is in two parts 36a and 36b, having ball retaining uprights 38 and 39, mounted on base portions 40 and 41, respectively, which are longitudinally slidably received in a suitable guide channel 35 on the upper side of an extension 10a of support 10. These member parts 36a and 36b are adapted to be relatively moved to engage and retain golf ball casing 37 between oppositely disposed conical recesses 42 and 43, to support the casing in alignment with the injection needle device 16. The arrangement is such that the member 36 may be moved along the guide channel 35, as a unit toward the stem 17, to project the stem through the casing 37 approximately to the center thereof, an opening 38a being provided in the upright 38 to permit reception of the stem into the casing.

The operation or use of the apparatus described will best be understood in connection with the procedure followed in super-tensioning the elastic windings on the ball casing 37. Accordingly, a casing 37 is provided in any suitable manner to have a central liquid center 44, of printing roller composition or other material, a liquid-retaining shell 45 of vulcanized rubber, this shell being provided with an inner lining 46 of self-sealing material such as raw unvulcanizable rubber, and an outer layer 47 composed of the usual windings of thread rubber. One way of providing the liquid-filled shell 45 is by forming the shell about a frozen pellet of said printing roller composition, the pellet being allowed to liquify for the present purposes.

With the handle 28 of the operating mechanism set in the left-hand position against stop 30, as illustrated in Figure 1, thereby to present the core 24 in its closed position within the stem 17, as shown in Figures 3 and 4, the member 36 with casing 37 carried thereby is moved along the guide portion 35 of supporting extension 10a, to project the stem and core through the casing into the liquid center 44, as shown in Figure 5. Next, the handle 28 is moved to the right to engage stop 31, as viewed in Figure 2, thereby to move the rack 26 to the left to remove core 24 inwardly from the stem 17, and thereby to allow free passage of injection fluid from the chamber 12 through the opening 18 of the stem to the interior of the ball casing, as shown in Figure 6. While the core 24 is thus removed from the stem 17, the operator may operate the screw 15, in known manner, to increase the pressure of the liquid within the ball casing for super-tensioning the

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rubber threads of the layer 47. As an example, the pressure, as indicated on the dial, is adjusted to something above 2,000 lbs. per square inch, after which it is adjusted slowly downwardly until the dial indicates a steady pressure of 2,000 lbs. per square inch within the ball casing. By means of this procedure the desired super-tensioning will have been accomplished. The handle 28 is thereafter moved back to the left-hand position of Figure 1, to move core 24 into its closed position within the stem 17, as shown in the step of Figure 7, and thereby to seal the end of the stem against return flow of fluid from the ball casing into the opening 18 of the stem, after which the supporting member 36 is moved outwardly of housing 11 to withdraw the injection needle device 16 from the casing, as shown in Figure 8. In withdrawing the injection needle device 16 from the casing, there will be no possibility of liquid material oozing from the end of the hollow stem 17, to become lodged in the puncture 50 made in the ball casing thereby, so that the possibility of leakage of the core liquid 44 through said puncture, which would cause rejection of the ball as commercially acceptable goods, is substantially eliminated. Also, movement of core 24 through the opening 18 of the stem maintains the same free of injection fluid which would tend to clog the needle.

When the rubber threads of the thread layer 47 are once super-tensioned or stretched to the point approximating the elastic limit thereof, and allowed to remain in that condition for a substantial period, such as 24 hours, the stretching process may be repeated as described above because the threads will then have become relaxed to an extent which permits such further super-tensioning. It has been found, however, that a satisfactory golf ball is produced with one super-tensioning operation. In any case, the super-tensioned casing is provided with the usual outer cover (not shown), such as balatta.

In Figure 9 is shown a modified form of the tip end, for injection needle device 16 previously described, wherein a stem 47 has a central passage 48 therethrough, but terminating in a taper at 49 corresponding to a sharply tapered extreme end portion 50 on the stem. A core 51, corresponding to core 24, is reciprocable in passage 48, as before, but terminates in a taper complementary to taper 49, there being a small outlet aperture 52 in the stem adapted to be closed by the end of the core in the needle-closed position, referred to above. That is, the aperture 52 is located away from the extreme end of the stem so as to assure a smooth point for injection purposes but close enough to said extreme end to be completely within a ball casing in order that valving of the fluid may be done inside said ball casing, and thereby assure efficient and effective operation of the injection needle.

Thus has been provided an improved fluid-injecting device or hypodermic needle, and apparatus for operating the same, adapted effectively to overcome the forementioned defects of the known prior art devices. It will be obvious that the device is capable of use for purposes other than described, where similar valving control at the end of the needle is desirable.

Modifications of the invention may be resorted to without departing from the spirit thereof or the scope of the appended claims.

What is claimed is:

1. A valvular device for flow-control of fluid with respect to a body, comprising an elongated needle-like stem having an outer tip end portion adapted to be inserted into the body, said stem having an opening longitudinally therethrough and terminating in an orifice communicating with the stem exterior at a point located on said outer tip end portion, said stem having therein an inner passage to said longitudinal opening at a point inwardly of said tip end portion, a housing having a fluid-containing chamber therein communicating with said longitudinal opening through said inner passage, an elongated closure core reciprocable within said longitudinal opening from a position thereof in which it closes said longitudinal opening substantially to said terminal orifice to a second position of the core in which said terminal orifice is in open communication with said chamber through said longitudinal opening and said inner passage, and means connected to said core and operable at will to reciprocate the same.

2. A valvular device for flow-control of fluid with respect to a body, comprising a housing having a fluid-containing chamber, a needle-like stem having an outer tip end portion adapted to be inserted into the body and having an elongated central opening therethrough and communicating exteriorly of the stem at a point located on said tip end portion, means for attaching said stem to said housing to project freely therefrom with the inner end of said central opening communicating with said chamber, an elongated closure core reciprocable in said central opening from a position thereof in which it closes said central opening substantially to tip end of the stem to a second position of the closure core in which said central opening is in open communication between the stem exterior and said chamber, and means connected to said core and operable to reciprocate the same.

3. A valvular device as set forth in claim 2, including means for relatively movably supporting a body to be in association with said stem, said supporting means being relatively movable to project said stem into said body for injecting fluid therein.

4. Apparatus of the character described, comprising a housing having a fluid-containing chamber, a needle-like stem having a tip end and having an elongated central opening therethrough communicating exteriorly of the stem at said tip end of the stem for passage of said fluid, means for attaching said stem to said housing to project therefrom with the other end of the stem opening communicating with said chamber, a closure core reciprocable into and out of said stem opening from and toward positions in which the opening is opened and closed therethrough, respectively, and means operable for reciprocating said core, said reciprocating means including a rack and pinion mounted in said housing, said closure core being attached to said rack, and an operating member being provided for rotating said pinion to reciprocate said rack and thereby reciprocate said core.

5. Apparatus of the character described, comprising a housing having a fluid-containing chamber, a needle-like stem having a tip end and having an elongated central opening therethrough communicating exteriorly of the stem at said tip end of the stem for passage of said fluid, means for attaching said stem to said housing to project therefrom with the other end of the

stem opening communicating with said chamber, a closure core reciprocable into and out of said stem opening from and toward positions in which the opening is opened and closed therethrough, respectively, and means operable for reciprocating said core, including means for relatively movably supporting an article to be fluid-injected in association with said stem, said supporting means being relatively movable to project said stem into the article for injecting fluid therein, said reciprocating means including a rack and pinion mounted in said housing, said closure core being attached to said rack, and an operating member being provided for rotating said pinion to reciprocate said rack and thereby reciprocate said closure core.

6. A valvular device for flow-control of fluid with respect to a body, comprising a housing having a chamber containing fluid under pressure, means for controlling the pressure of said fluid in said chamber, a needle-like stem having an outer tip end portion adapted to be inserted into the body and having an elongated central opening therethrough and communicating exteriorly of the stem at a point located on said tip end portion, means for attaching said stem to said housing to project freely therefrom with the inner end of said central opening communicating with said chamber, an elongated closure core reciprocable in said central opening from a position thereof in which it closes said central opening substantially to the tip end of the stem to a second position of the closure core in which said central opening is in open communication between the stem exterior and said chamber, and means connected to said core and operable to reciprocate the same.

7. An injection device of the character described, comprising a needle-like stem having a tip end and having an elongated opening therethrough communicating exteriorly of the stem at said tip end of the same for passage of fluid, an elongated closure core reciprocable into and out of said opening toward and from positions in which the opening is opened and closed entirely therethrough, respectively, and means for mounting said core to be reciprocable between said opened and closed positions thereof, said core in the closed position thereof having a pointed end projecting from said tip end of said stem.

8. An injection device of the character described, comprising a needle-like stem having a tip end and having an elongated opening therethrough communicating exteriorly of the stem at said tip end of the same for passage of fluid, an elongated closure core reciprocable into and out of said opening toward and from positions in which the opening is opened and closed therethrough, respectively, said core in the closed position thereof having a pointed end projecting from said tip end of said stem, said outer end of the stem being tapered to blend smoothly with said pointed end of the core.

9. Apparatus for injecting golf balls or the like fluid-filled articles comprising a housing having a chamber containing injection fluid supply adapted to be under pressure, an elongated needle-like stem having a tip end and having an elongated central opening therethrough communicating exteriorly of the stem at said tip end of the same for passage of said injection fluid, means for attaching said stem to said housing to project therefrom with the other end of the stem opening communicating with said chamber, a closure core reciprocable into and out of said

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opening from and toward positions in which the opening is opened and closed therethrough, respectively, and means for reciprocating said core, means being included for relatively movably supporting said article in association with said stem, said supporting means being relatively movable to project said stem into said article for injecting fluid therein.

10. Apparatus for injecting golf balls or the like fluid-filled articles comprising a housing having a chamber for containing injection fluid supply adapted to be under pressure, an elongated needle-like stem having a tip end having an elongated central opening therethrough communicating exteriorly of the stem at said tip end of the same for passage of said injection fluid, means for attaching said stem to said housing to project therefrom with the other end of the stem opening communicating with said chamber, a closure core reciprocable into and out of said opening from and toward positions in which the opening is opened and closed therethrough, respectively, and means for reciprocating said core, means being included for relatively movably supporting said article in association with said stem, said supporting means being relatively movable to project said stem into said article for injecting fluid therein, said reciprocating means including a rack and pinion mounted in said housing, said closure core being attached to said rack, and an operating member being provided for rotating said pinion to reciprocate said rack and thereby reciprocate said closure core.

11. A valvular device for flow-control of fluid with respect to a body, comprising an elongated needle-like stem having an outer tip end portion adapted to be inserted into the body, said stem having an opening longitudinally there-through and terminating in an orifice communi-

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cating with the stem exterior at a point located on said outer tip end portion, said stem having therein an inner passage to said longitudinal opening at a point inwardly of said tip end portion, a housing having a fluid-containing chamber therein communicating with said longitudinal opening through said inner passage, an elongated closure core reciprocable within said longitudinal opening from a position thereof in which it closes said longitudinal opening substantially to said terminal orifice to a second position of the core in which said terminal orifice is in open communication with said chamber through said longitudinal opening and said inner passage, and means connected to said core and operable at will to reciprocate the same, said tip end of said stem being pointed and said terminal orifice being spaced from the extreme tip end of the stem.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
742,990	Humphrey	Nov. 3, 1903
1,010,247	Frederick	Nov. 28, 1911
1,167,396	Gammeter	Jan. 11, 1916
1,424,191	Arnott	Aug. 1, 1922
2,306,243	Black	Dec. 22, 1942
2,389,355	Goland et al.	Nov. 20, 1945
2,396,351	Thompson	Mar. 12, 1946

FOREIGN PATENTS

Number	Country	Date
739,717	France	Nov. 3, 1932
359,578	Italy	May 30, 1938