April 5, 1960 R. J. SHELNER 2,931,679

INSTALLATION TOOL FOR CHECK VALVE ASSEMBLY

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Fig. 1

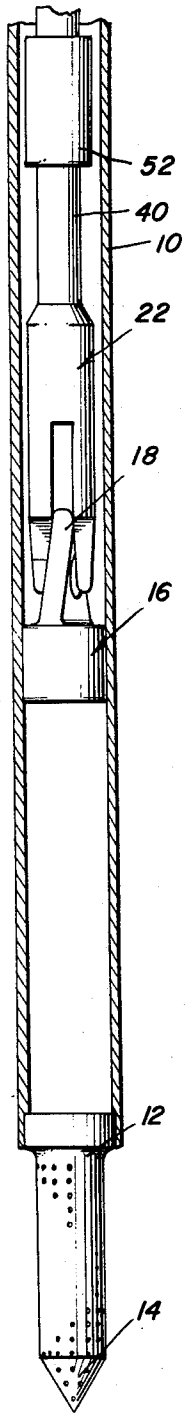


Fig. 2

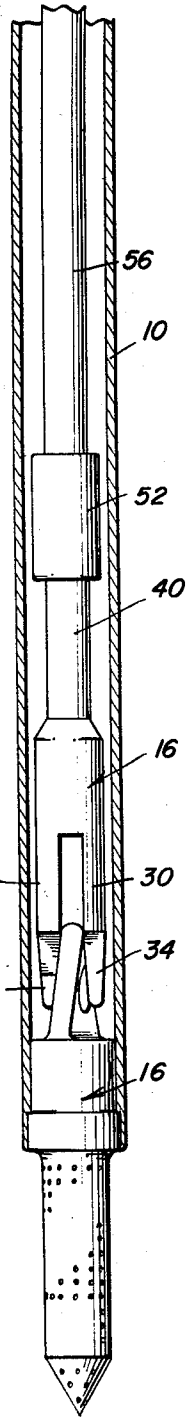
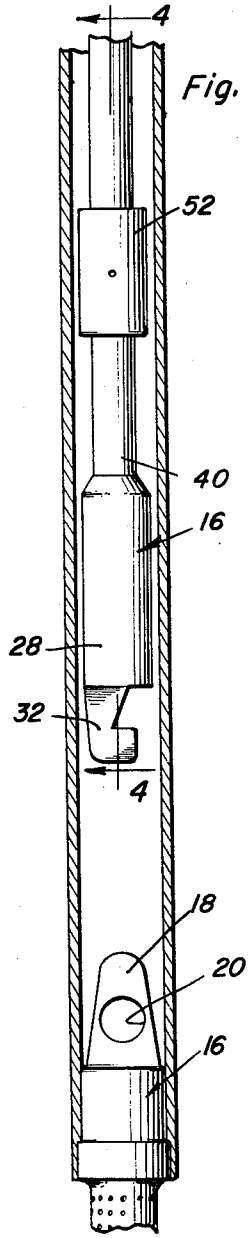


Fig. 3



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Fig. 4

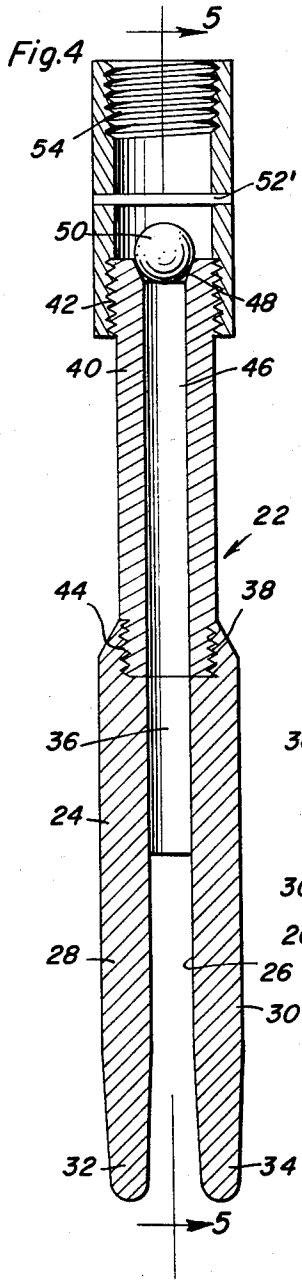


Fig. 5

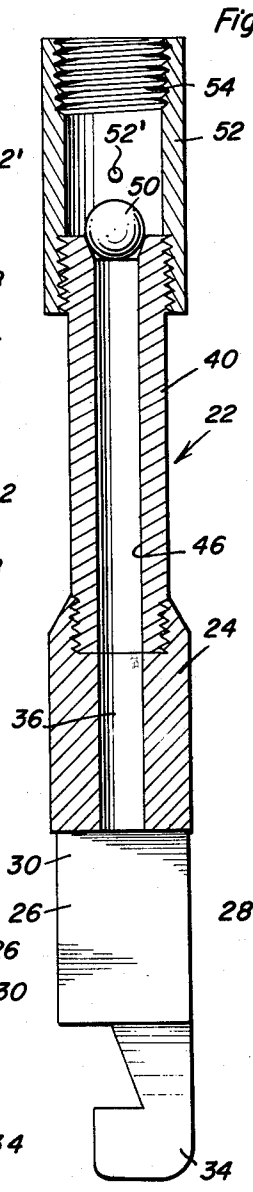


Fig. 8

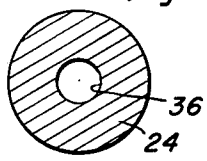


Fig. 9

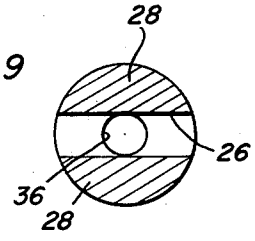


Fig. 6

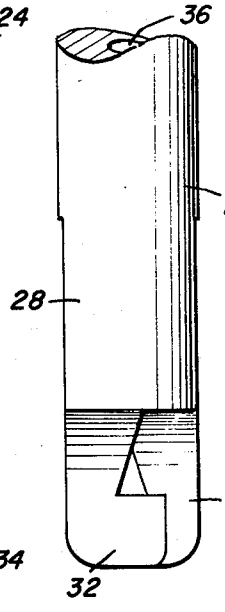
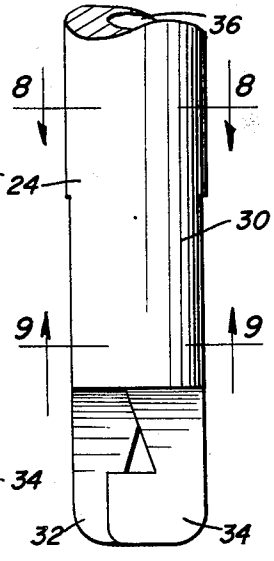


Fig. 7



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INSTALLATION TOOL FOR CHECK VALVE ASSEMBLY

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Application August 2, 1957, Serial No. 675,862

2 Claims. (Cl. 294—86)

This invention comprises a novel and useful installation tool for check valve assembly and more particularly relates to a device especially adapted to easily and effectively engage and release a conventional check valve assembly for installing the same in or removing the same from the lower end of a well pipe.

The primary purpose of this invention is to provide a tool which shall be especially adapted for effectively installing or removing a conventional check valve assembly from the lower portion of a well pipe, when it is necessary to remove, insert, replace or service a check valve assembly.

A further object of the invention is to provide a device in accordance with the foregoing object which may be readily secured to the lower end of a pipe or rod for easy passage into and out of a well pipe to perform its function.

Still another object of the invention is to provide a device in accordance with the preceding objects which shall have passage means therethrough facilitating the passage of fluid through the device as the same with a valve assembly is inserted into or removed from a well pipe.

A still further important object of the invention is to provide a device in accordance with the above mentioned objects which shall include therein a check valve assembly.

A still further important object of the invention is to provide a device as recited in the preceding objects which shall be adapted to straddle and embrace the handle of a check valve assembly and which will secure a positive engagement with the handle which may be readily engaged therewith or may be readily released therefrom to thereby facilitate the placing of a valve assembly in a desired location in a well pipe or its removal therefrom.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a view in vertical section through a portion of the lower end of a well pipe illustrating the manner in which the tool of this invention is employed to introduce or remove a valve assembly;

Figure 2 is a view similar to Figure 1 but showing the manner in which the tool is employed to lower the check valve assembly to its seat upon the lower end of the well pipe;

Figure 3 is a view similar to Figure 1 but showing the manner in which the tool is withdrawn after the check valve assembly has been positioned in the well pipe;

Figure 4 is a vertical transverse sectional view taken on an enlarged scale substantially upon the plane indicated by the section line 4—4 of Figure 3 and showing the internal construction of the special installation tool of this invention;

Figure 5 is a view taken at right angles to Figure 4,

being taken substantially upon the plane indicated by the section line 5—5 of Figure 4;

Figures 6 and 7 are fragmentary side elevational views taken from opposite sides of the lower end of the tool of Figures 4 and 5; and

Figures 8 and 9 are horizontal sectional detail views taken substantially upon the planes indicated by the section lines 8—8 and 9—9 respectively of Figure 7.

The installation tool of the present invention is specifically adapted for use in installing or removing the check valve assembly customarily placed at the lower portion of a well pipe of 2 inches or greater diameter, and which is commonly employed in drilled water wells.

Heretofore the installment of a check valve assembly either initially or after the well has been drilled, and the servicing of the check valve assembly as well as its removal from the well pipe has been a rather difficult operation. By means of the present invention, an installation tool is provided which may be readily attached to a string of rods or pipe, and may be thereby inserted into the well pipe either for engaging a check valve assembly for removing the same, or for installing a check valve assembly and placing the same in the well pipe.

In the accompanying drawings the numeral **10** designates a portion of the lower end of a well pipe which as above mentioned may be of 2 inches in diameter, or greater if desired, and which at its lower end is provided with a perforated screen **12** having a pointed lower end as at **14**, which facilitates the penetration of the well pipe into the soil during the forming or drilling of the well, and which filters or screens the water entering the lower end of the well pipe from the surrounding formation. Indicated generally by the numeral **16** is a conventional form of check valve assembly customarily placed in the lower end of the well pipe **10** above and rested upon the upper end of the screen **12**. The function of this check valve assembly is to permit entry of water into the pipe and prevent its flow downwardly from the lower end thereof. A conventional form of check valve assembly for which the present invention is specifically designed includes a medially disposed upstanding web **18** constituting a handle having a transverse bore or aperture **20** therethrough. Use is made of this handle and its aperture for establishing a highly effective and secure detachable engagement between the installation tool designated generally by the numeral **22** and the handle of the check valve assembly **16**.

Referring now particularly to Figures 4–7, it will be seen that the tool **22** comprises an elongated body **24**, generally cylindrical in shape and which is of somewhat lesser diameter than that of the interior of the well pipe **10** in order that the same may pass freely and loosely through the well pipe as suggested in Figures 1–3. It is preferred to medially and longitudinally slot or bifurcate the lower end of the body **24**, to provide a slot **26**, see also Figure 9, extending axially thereinto. The furcations containing the slot are designated by the reference numerals **28** and **30** and at their lower ends these furcations have oppositely directed laterally projecting portions **32** and **34** respectively as shown best in Figures 6 and 7. At their lower ends these furcations converge slightly towards each other at their outer surfaces as will be best apparent from Figure 4, and an axially disposed passage **36** extends through the elongated body opening at its lower end into the slot **26** and at its upper end opening into an internally threaded bore **38**. The latter receives a diametrically reduced tube **40** having externally threaded upper and lower ends as at **42** and **44**, the latter being received in the bore **38**, the tube having an internal passage **46** forming a continuation of the bore **36**.

At its upper end the tube **40** is provided with a valve

seat **48** with which a ball check valve **50** cooperates. There is further provided an internally threaded sleeve or coupling **52** serving to retain the ball check valve **50** and comprising a cage for the same, this sleeve having a diametrically disposed pin **52'** for retaining the ball valve, and being internally threaded as at **54** for engagement with the lower end of a rod or pipe **56** by means of which the tube may be raised or lowered.

From the foregoing, it is believed that the operation of the tool will now be readily understood. The tool as shown in Figures 4 and 5 is connected to the lower end of the rod or pipe **56**, and the handle **18** of the check valve assembly **16** is introduced into the lower bifurcated end of the tool, the position of the parts being that shown in Figure 2. Thereupon, the tool is rotated through 90° by rotation of the supporting rod or pipe **56** thus causing the two hooks **32** and **34** to penetrate the eye or aperture **20** of the handle **18** and thus securely hold the check valve assembly. In this position the device is lowered in a well pipe, and it will be noted that any fluid in the pipe can readily flow through the passages **36** in the tool, the bore **46** in the tube **40** and pass the check valve **50**, thereby facilitating the introduction of the tool into a well pipe. The lowering of the tool with the check valve assembly is illustrated in Figure 1. When the check valve assembly has been lowered to a position where it rests upon the top of the strainer sleeve **12** or other seat provided therefor, the tool is rotated a quarter turn in a direction to cause the hooks to withdraw from the eye, as shown in Figure 2. Thereupon the tool may be withdrawn as shown in Figure 3, leaving the check valve assembly in place. Obviously, the reverse operation may be employed to retract or remove a check valve assembly from a position in the well pipe when it is necessary to replace or service the same.

The check valve assembly **48, 50** in the tool enables the latter to be employed as a means for trapping any sand which may be present in the well, by pumping the same.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. An installation tool for a well pipe check valve assembly of the type adapted to seat in a well pipe adjacent the lower end of the latter, said assembly having an upstanding diametrically disposed apertured ear at its upper end, said tool comprising; a substantially cylindrical body of a diameter sufficiently small for ready passage through a well pipe, means on the upper end of said body for securing the same to a string of rod or pipe whereby said body may be inserted into or withdrawn from a well pipe to install or remove a check valve assembly, the lower end portion of said body being formed with a diametric slot which separates the same into a pair of spaced side sections having recessed lower end portions defining a pair of parallel hooks facing in opposite directions transversely of said body and overlapping each other, said hooks having downwardly convergent inner and outer surfaces whereby said slot is of a greater width at the bottom than at the top thereof, said hooks being sufficiently spaced from each other to loosely receive the ear of said assembly therebetween and being positioned to enter the aperture in said ear from opposite sides thereof when the body is rotated with the ear disposed between said hooks whereby to detachably engage the hooks in the ear aperture.

2. The combination of claim 1 wherein said body has a longitudinal bore therethrough in communication with said slot for passage of fluid therethrough when said body is raised or lowered in a well pipe and a downwardly closing check valve in said passage.

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