My invention relates primarily to check valves used in connection with underground tanks in which fluids, such as gasoline, are stored, these tanks being connected to the pumps of various types for the withdrawal and dispensing of the contents, it being one of the requisites of the connections for the pumps that a check valve be employed and located as near to the tank itself as is practicable, the check valve acting to permit a flow of fluid from the tank to the pump but restrain a flow in the reverse direction for the purpose of maintaining the priming of the pump.

It has been found that in the use of storage tanks for gasoline there is a constant and considerable condensation of water within the tank and that this water eventually rises to the bottom of the suction pipe to the pump and is drawn up and collects around the check valve where, in extremely cold weather, the water freezes and prevents the operation of the pump by cutting off its supply of fluid, and in the use of the ordinary piping and fittings, including check valves when this condition arises, it is necessary to dig down and uncover the check valve, then open it and remove the ice, then close the valve and recover the piping, all of which is an expensive and exceedingly inconvenient operation, and in those cases where the piping and the check valve are below a concrete or other pavement, the difficulties and expense of reaching the check valve are greatly magnified, and therefore it is one object of my invention to provide a construction wherein should there be an accumulation of water and consequent freezing, the working parts of the check valve may be readily removed without disturbing the pipe connections and without digging up or otherwise disturbing the pavement or the ground above the check valve.

It frequently happens that a particle of dirt will lodge on the seat of the check valve and hold it partly open whereupon the fluid above the check valve will flow back to the tank, the pump priming being lost, again requiring digging down to the check valve and cleaning it and afterwards filling over it again where the ordinary types of piping and fittings are employed, therefore it is another object of my invention to provide a construction wherein, without the necessity for any digging or disturbing of either the ground or the piping connections, the disc and seat of the check valve may be removed from above ground, cleaned, or renewed, as occasion may require, and replace in a comparatively short space of time to the end that practically no delay in the operation of the pump will be required, and the only expense involved being for any parts, if such are necessary.

A further object of my invention is the provision of a construction wherein a clear and unobstructed passage may be provided from above the ground to the bottom of the suction pipe of the tank to the end that should it be required to either remove the contents from the tank, or in those cases where the tank contains gasoline and after an excessive accumulation of water, to pump out the water from below the gasoline, the suction pipe or tube from any suitable pump may be inserted to the bottom of the tank through the regular suction line, so that if a flexible connection or hose is used to the pump, the operator may be assured that the suction end of this hose is at the bottom of the tank and is not coiled up within the tank as would be the case if the suction hose were merely inserted through the filling opening.

In carrying out the objects listed above, I have illustrated and will now describe a form of device suitable for the purpose, but I do not limit myself to the precise details of construction or arrangement of parts shown and to be presently described, but reserve to myself all changes and modifications which may be made and which fall within the breadth or scope of the appended claims.

The novelty of my invention will be hereinafter more fully set forth and specifically pointed out in the claims.

In the accompanying drawing:

Fig. 1 is a side elevation of one form of my device showing it attached to and forming a part of the suction line from a tank to a pump, a portion of the tank being shown.

Fig. 2 is a central sectional side elevation.
of a slightly different form of the device showing the outlet connection adjacent the top thereof instead of adjacent the bottom as in Fig. 1.

Fig. 3 is an enlarged sectional detail of the seat ring, and its gasket and seal.

The same numerals of reference are used to indicate identical parts in all the figures.

Describing those parts which are common to the ordinary pumping system from a subterranean tank 4 represents the upper portion of one end of a tank which is provided with a suction line 5, the latter extending to a point a short distance above the bottom of the tank so that all or nearly all of its contents may be removed by the pump. The upper end of the suction line carries the check valve and the outlet from the check valve is through the pipe 6 which leads to the pump which is placed in any suitable location.

In constructing my check valve I provide an elongated housing 7 to the lower end of which the suction line 5 is connected while the outlet pipe from the check valve is connected to a side port 8. In Fig. 1, this port is located near the bottom of the housing 7 and in Fig. 2 it is located near the top thereof in which the upper end of the housing 7 is closed by a removable plug 9, the latter being provided with a gasket 10 to properly seal it against leakage.

Referring now to Figs. 2 and 3, I will describe the interior construction of my device. In the lower portion of the housing 7 I form a seat 11 which is adapted to receive the seat ring 12 with which the disc or the closure 13 cooperates, this disc being provided with a guiding stem 14 which passes through and is guided in a spider 15 formed in the seat ring 12. The seat ring is provided with a gasket 16, which, when the device is properly assembled forms a tight joint between the seat ring 12 and a seat 11.

The lower end of a tube 17 rests upon the seat ring 12 and the upper end of this tube is engaged by an annular nut 18 which is screwed into the upper end of the housing 7, and is provided with internal lugs for engagement with a suitable wrench so that the tube may be forced downward to cause a proper engagement between the gasket 16 and the seat 11.

The lower end of the valve guiding stem 14 is provided with a suitable extracting device such as a cotterpin 20, and the upper surface of the disc or closure 13 carries a pair of arms 21 through the upper ends of which a pin 22 is passed, and between which, and below the pin 22, a transverse pin 23 extends, this pin being carried by the tube 17.

Near the upper end of the tube 17 a second pin 24 is mounted, and this pin serves as a means for engagement with a hook or other suitable extracting device when it is desired to remove the tube 17 and its associated parts from the housing 7.

As shown in Fig. 3, the tube 17 is provided with perforations 25 to permit fluid to pass from the inside to the outside of this tube into the housing.

Assuming that the housing 7 is connected to the piping as shown in the drawing and the interior parts are all in position as shown in Fig. 2, and that it is desired to remove the seat ring 12 and the closure disc 13, either to clean or renew the valve or to remove water or other objectionable contents from the piping system, the operation of my device is as follows:

It is to be understood that the housing 7 is of sufficient length to project upwardly from the ordinary point to which the check valve is located to the ground surface and either project slightly thereafter as shown in Fig. 1 or be mounted in some form of box with a readily removable cover so that the plug 9 may be easily reached and removed. After the removal of the plug 9 the proper wrench is inserted into the ring 18 and this ring unscrewed and removed. By means of any suitable hook the operator engages the upper pin 24 and pulls upward on the tube 17 whereupon the pin 23 comes in contact with the pin 22, and after the closure disc 13 has been raised, the pin 20 comes in contact with the lower portion of the spider of the seat ring 12 and a further upward movement results in the extraction of the check valve and all of its assembled parts from within the housing 7 and permits a free passage from the top of the housing 7 to the bottom of the suction pipe 5 within the tank.

It is to be noted that the check valve and its seat may be removed from the lower end of the valve 17 by removing the pin 25 so that either of the parts composing the check valve may be renewed if required or cleaned, after which the parts are replaced and the pin 23 replaced whereon, by lowering the tube 17 into the housing 7, the seat ring 12 is engaged with its seat 11 and the upper ring 18 is screwed down upon the upper end of the tube to complete the mounting of the check valve within the housing, and the plug 9 re-engaged with the upper end of the housing when the whole device is again ready for operation, and it is to be noted in this connection that this removal, cleaning and replacing of the check valve may be easily and quickly accomplished without disturbing the pipe connections or digging around them, and further that the whole removal and replacing operation may be performed in a very short time, thus permitting the system to be operated at higher efficiency with the least possible delay in remedying an undesirable condition, such as leaking of the
check valve or the formation of ice around it.

In those cases where the ordinary check valve has been installed and it is desired to replace it with my check valve, the construction shown in Fig. 1 might be preferred because the pipe connections are in the same relation as those formerly used, though in any installation it might be preferable to use the construction shown in Fig. 2 as the length of pipe from the bottom to the top of the housing is saved when the construction of Fig. 2 is used.

Having thus described my invention, I claim:

1. In a subterranean check valve the combination of an elongated housing, an inlet passage to the housing, an outlet passage from the housing, a check valve between the two passages, and means extending from the check valve to a point adjacent one end of the housing and disengageably cooperating with the housing to exert a downward pressure to hold the check valve in position and when disengaged serving to remove the check valve from the housing.

2. In a subterranean check valve the combination of an elongated housing open at both ends one of said ends forming an inlet passage, a lateral outlet passage formed in said housing, a removable seat ring, a closure for said seat ring and forming therewith a check valve, a seat within the housing and between the inlet and outlet passage and adapted to receive the seat ring, and means within the housing and extending from the seat ring to a point adjacent the end of the housing opposite to the inlet passage and disengageably cooperating with the housing to exert a downward pressure to hold the seat ring in position and when disengaged said means also serving to remove the seat ring and its closure, and a closure for the end of the housing.

3. In a subterranean check valve the combination of an elongated housing extending from a point near the surface of the ground to a point near a subterranean tank, an inlet passage from the lower portion of the housing to the tank, an outlet passage from the housing, a seat between the two passages, a seat ring adapted to be mounted in the seat, a closure for the seat ring, a perforated tube removably mounted in the housing and for holding the seat ring in operating position, and means cooperating between the tube and the closure whereby when the tube is moved in removing it from the housing it will first raise the closure to open position and then remove both the closure and the seat ring.

4. In a subterranean check valve the combination of an elongated housing extending from a point near the surface of the ground to a point near a tank, an inlet passage from the lower portion of the housing to the tank, an outlet passage from the housing, a seat between the two passages, a seat ring adapted to be mounted in the seat, a closure for the seat ring, a perforated tube removably mounted in the housing and for holding the seat ring in operating position, and means cooperating between the tube and the closure whereby when the tube is moved in removing it from the housing it will first raise the closure to open position and then remove both the closure and the seat ring.

JOHN J. MOHLER.