

Nov. 3, 1936.

W. C. ERWIN ET AL

2,059,627

WELL CLEANING DEVICE

Filed April 22, 1933

2 Sheets-Sheet 1

Fig. 1.

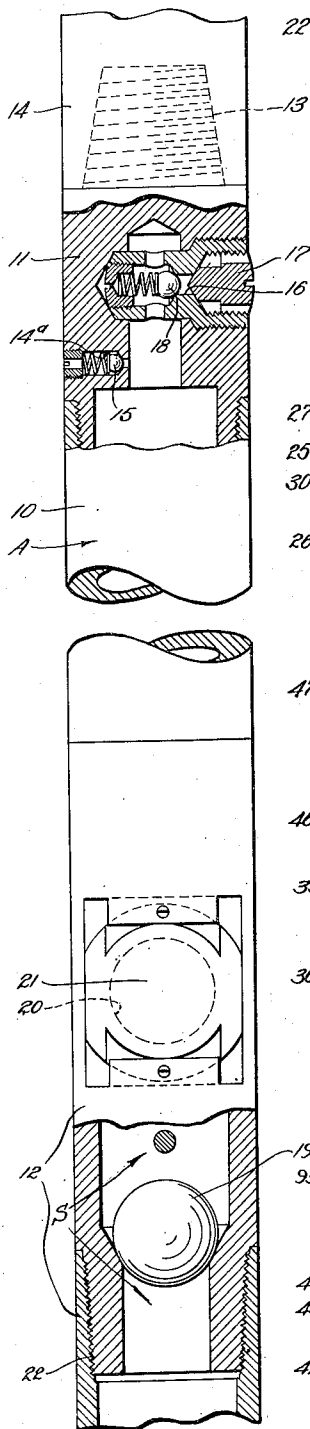


Fig. 2.

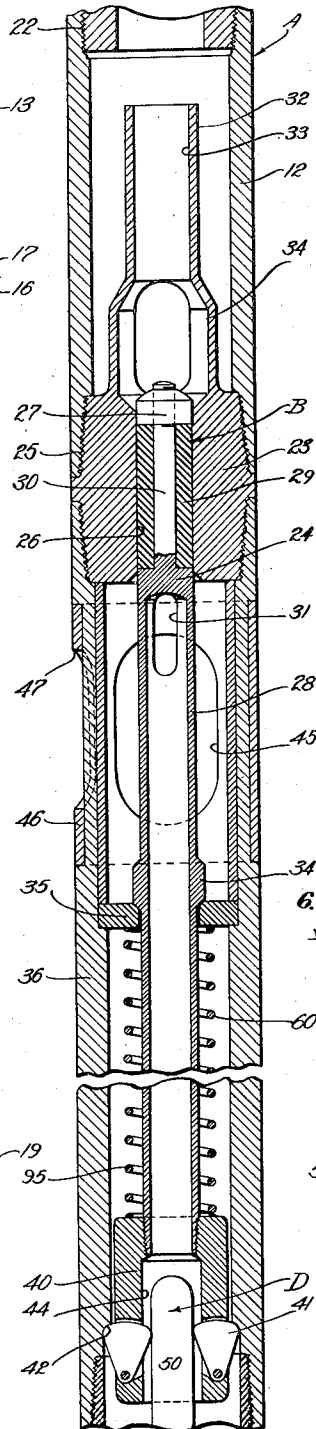
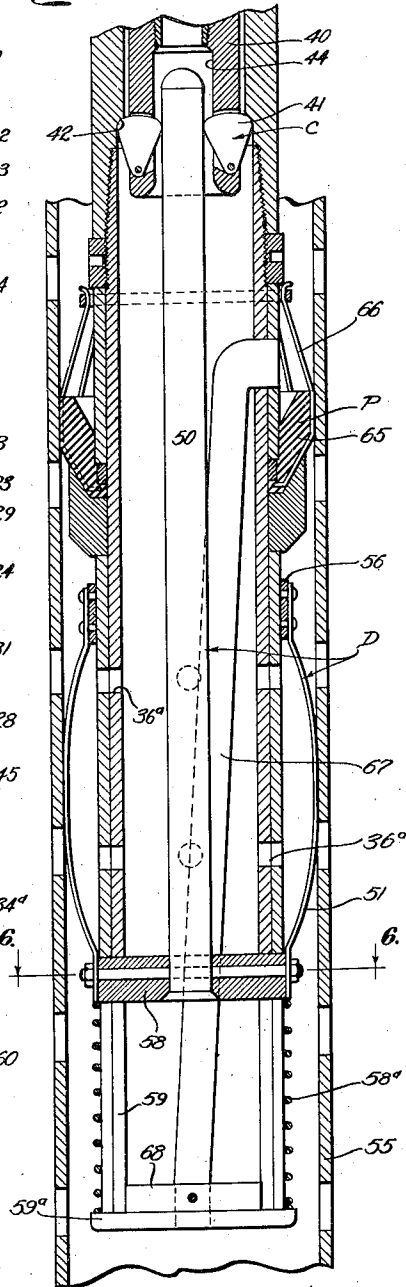


Fig. 3.



Inventors
Weldon C. Erwin
and
Cecil H. Sweet
By *W. H. Sweet*
Their Attorney

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2 Sheets-Sheet 2

Fig. 4.

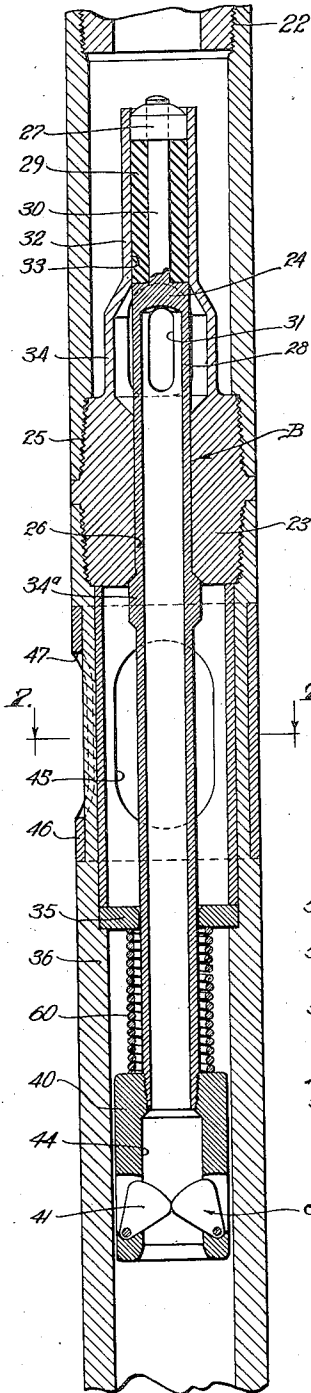


Fig. 5.

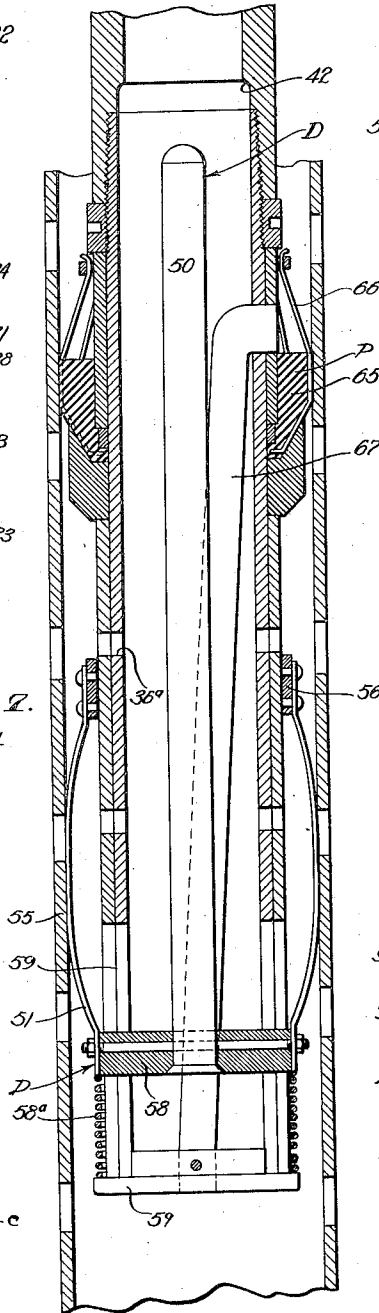


Fig. 6.

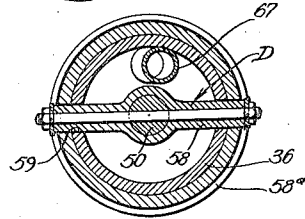


Fig. 7.

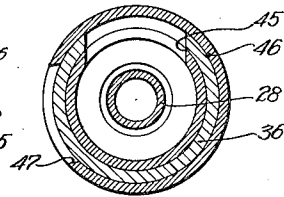
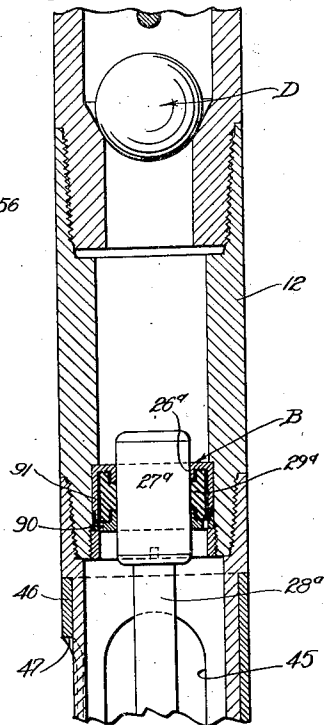


Fig. 8.



Inventors
Weldon C. Erwin
and
Cecil H. Sweet
By *Ni. Wheat*
Their Attorney

UNITED STATES PATENT OFFICE

2,059,627

WELL CLEANING DEVICE

Weldon C. Erwin and Cecil H. Sweet, Brea, Calif.,
assignors to John Grant, Los Angeles, Calif.

Application April 22, 1933, Serial No. 667,437

25 Claims. (Cl. 166—19)

This invention relates to a well cleaning device, and it is a general object of the invention to provide a simple, practical and improved device for removing material from a well.

In the course of drilling and operating a well, particularly an oil well, the necessity arises for removing or cleaning material from the well or from parts in the well. Cleaning operations such as we refer to are commonly performed by well bailers or cleaners. The structure of the present invention is in the nature of a well bailer or cleaner, and the device of the invention can be used to advantage in various well cleaning operations where well bailers and cleaners are now commonly employed. The present invention may be embodied in a structure that is typically a well bailer, and it may be embodied in a form making it practical and effective as a well cleaner suitable for cleaning perforated well casing, or the like. Throughout this disclosure we will refer to the structure of the invention as a well cleaner, it being understood that we contemplate use of the structure either as a bailing device or a cleaning device, more specifically intended to clear perforated casing, or the like.

It is a general object of the present invention to provide a well cleaner in which the loading or filling action of the device is effected by the hydrostatic head of fluid in the well, and in which the device is opened for the reception of material by the hydrostatic head of fluid in the well. The structure of the present invention being operated by the hydrostatic pressure of fluid in the well is dependable in operation, and is not subject to failures or difficulties that frequently accompany spring or other mechanically actuated devices.

A further object of the present invention is to provide a device of the character just referred to, in which the action of the device is under control of the operator through a suitable control mechanism operated by suitable manipulation of the device in the well.

Another object of the present invention is to provide for various improvements and refinements in the formation and arrangements of parts in a device of the character hereinabove mentioned.

The various objects and features of our present invention will be best and more fully set forth from the following detailed description of typical forms and applications of the invention throughout which description reference is had to the accompanying drawings, in which:

Fig. 1 is a view of the upper portion of a tool

embodying the present invention, showing a certain of the parts in section.

Fig. 2 is a longitudinal detailed sectional view of the middle portion of the tool embodying the invention.

Fig. 3 is a longitudinal detailed sectional view of the lower portion of the tool embodying the invention.

Fig. 4 is a view similar to Fig. 2 showing the parts in a different operative position.

Fig. 5 is a view similar to Fig. 3 showing the parts in a different operative position.

Fig. 6 is a detailed transverse sectional view of the tool taken as indicated by line 6—6 on Fig. 3.

Fig. 7 is a detailed transverse sectional view taken as indicated by line 7—7 on Fig. 4.

Fig. 8 is a view of a portion of the tool showing a different form of construction.

The tool embodying the present invention includes, generally, a body A forming a container for the reception of material to be removed from the well, a closure means B for the lower end of the body, and operable to open the body for the reception of material from the well, means C for releasably holding the closure in position to prevent the admittance of material from the well to the body, a control D for the means C, whereby the means C, may be operated to release the closure B so that material from the well is admitted to the body A, and various other parts or elements, the details and functions of which will be hereinafter set forth.

The body A which forms the container to receive material from the well is an elongate tubular element or structure, and acts as a support or carrier for the other parts or elements of the device. The body A is preferably of sectional construction, and in the form illustrated it includes a central or main section 10, a top section 11, and a bottom section 12. The main section 10 may be a plain, tubular part sufficiently long to give the low-pressure or charge-receiving chamber S the desired capacity. The top section 11 closes the upper end of the section 10, and acts as a part or fitting by which the device may be connected with a suitable operating member, such as a string of pipe, operating line or other suitable means. In the drawings we have shown section 11 provided with a tapered threaded pin projection 13 to receive a coupling 14 of a suitable operating element such as a lowering tool in the form of a drill stem, rod or cable. The top section 11 is shown provided with an opening 14a controlled by a spring loaded check valve 15

which operates to prevent an excessive pressure developing or occurring in the body as the device is removed from the well. Another opening 16 is provided in the section 11, which opening is controlled by a plug 17 and a check valve 18 so that pressure can be admitted into the body A to facilitate unloading the body after the device has been removed from the well.

The body section 12 is threaded or otherwise connected to the section 10, and in the preferred form of the invention it is a tubular part carrying a charge-retaining check valve 19 arranged to prevent discharge of material from the lower end of the body, and the means B hereinafter described.

The body section 12 is provided with a lateral discharge opening 20 at a point above the valve 19, which opening is provided with a suitable removable closure 21. To facilitate manufacture, the upper portion of the body section 12, which carries the valve 19 and is provided with the opening 20, is formed separate from the lower portion of the section 12, which carries the means B, the two parts being connected or assembled by means of a suitable threaded section 22.

The closure means B provided by the present invention is carried by the body section 12, it being preferred to apply the means B to the lower end of the body section 12, as clearly illustrated in Fig. 2 of the drawings. The closure means provided by our present invention includes, generally, an orifice member 23 attached to the body or body section 12, and a plug type closure 24 cooperating with the orifice member. The orifice member 23 is illustrated as being screw threaded to the lower end of the body section 12 through a suitable threaded connection 25, so that it is in effect a part or continuation of the body of the device. The orifice member is provided with a central longitudinal passage or orifice 26 adapted to admit material from the well into the body of the device, the orifice is preferably a straight, smooth bore to accommodate the plug closure 24.

The plug closure 24 includes a plug portion 27 adapted to fit the orifice 26 of the member 23, and a tubular stem 28 extending downwardly from the plug 27. In accordance with our invention, we provide means for establishing and maintaining a tight fit or connection between the plug 27 and the orifice 26, and in the case illustrated in Figs. 2 and 4 of the drawings, this connection or fit is obtained by providing a sleeve 29 of packing material, such as rubber, or the like, on the plug 27, to fit tightly in the orifice 26. To facilitate assembling of the parts of the plug just described, the upper end portion of the plug may be in the form of a removable head or follower threaded onto the reduced portion 30 of the plug, which carries the sleeve 29.

The tubular stem projects downwardly from the plug 27, and is open at its lower end. Lateral openings 31 are provided in the stem 28 immediately below its point of connection with the plug 27. The parts of the closure means are proportioned so that the lateral openings 31 are above the orifice member 23 when the closure has been operated or released. This positioning of the parts is illustrated in Fig. 4 of the drawings. In accordance with the preferred form of the invention, the tubular stem 28 is of the same size or diameter as the plug, and is finished to slidably fit the orifice 26 in member 23 so that a continuous bearing engagement is maintained between the orifice member 23 and the plug closure 24 under all operating conditions.

When the device is operated in a well there is

a violent or rapid flow of material through the closure means and into the body A, which flow may tend to cut or dislodge the packing sleeve 29 of the plug 27. To overcome this condition, we provide a tubular cage 32 a suitable distance above the orifice member 23, which cage has a bore 33 adapted to slidably receive the plug 27, as shown in Fig. 4, so that the packing sleeve of the plug is protected. In practice the cage 32 may be mounted in any suitable manner, it being preferred to support it from the orifice member 23 through suitable spaced supports 34.

The construction just described may include means for limiting the movement of the plug closure 24 with reference to the orifice member 23. In the drawings we have shown a projection or flange 34* formed on the stem 28 a suitable distance below the plug 27, which flange cooperates with the lower end of the member 23 to limit upward movement of the stem, and a stop 35 provided in an extension 36 of the body to limit the downward movement or travel of the plug closure 24, though it will be understood this extension may be broadly considered a part of the body, proper. The body extension 36 is in the form of a tubular part connected to the orifice member 23 to project downwardly therefrom, so that it is in effect an extension or continuation of the body of the device. The extension 36 has openings 36* to admit material into the device.

The means C is in the nature of a holding means for releasably holding the plug closure 24 in a down position, where the plug 27 occupies and closes the orifice 26. The means C illustrated in the drawings includes a head 40 on the stem 28, carrying latch members 41, which cooperate with a shoulder 42 provided in the body extension 36. The head 40 is shown applied to the lower end of the stem 28, while the latches 41 are pivotally carried by the head 40 to be shiftable laterally of the device into and out of the engagement with the shoulder 42. The shoulder 42 is formed in the body extension 36 so it faces downwardly, as clearly illustrated in Figs. 2 and 3 of the drawings. The head 40 is a tubular element, the opening 44 of which forms a continuation of the opening of the stem 28. The latches 41 are carried by the head 40 so that they have inner parts projecting into the opening 44 to be engaged by the control means D hereinafter described.

The shoulder 42 is cut on such a curve or angle, and the latches 41 are so related to the shoulder that force applied upwardly through the stem 28 dis-engages the latches 41 from the shoulder 42.

In accordance with the preferred form of the invention, one or more lateral openings 45 of considerable extent are provided in the body extension 36, making the plug closure 24 accessible from the exterior of the device so that it can be moved downwardly to operating position after the device has been actuated. A sleeve 46 is rotatably mounted on the body extension at the apertures 45, and is provided with apertures 47 adapted to be moved into and out of register with the apertures 45. When the apertures 47 are out of register with the apertures 45 the apertures 45 are closed.

The control means D provided for controlling the holding means C is carried by the body extension 36, and includes, generally, a control rod 50 arranged longitudinally in the body extension 36, and adapted to cooperate with the latches 41, and a plurality of corresponding elements 51, which are arranged at the exterior to cooperate with a casing 55, or the like, in which the device

is being operated. The gripping elements 51 are in the form of leaf springs, or the like, having their ends connected to a ring 56 and a cross arm 52. The ring 56 is slidably mounted on the exterior of the body extension 36. The middle portions of the gripping elements 51 are bowed outwardly to normally, frictionally engage the inner wall of the casing 55, and thus tend to resist movement in the casing. The cross arm 53 operates in slots 59 provided in the body extension. A spring 58^a is arranged around the extension 36 between the arm 52 and a shoulder 58^a to normally yieldingly hold the structure just described in an up position on the extension.

The cross arm extends diametrically through the body extension, and carries the control rod 50. The control rod 50 extends through the body extension 36 and into the head 40 to cooperate with the latches 41. When the control is in position to hold the means C in operation, the control rod 50 extends into the head 40 and engages the latches 41 to hold them out and in engagement with the shoulder 42, as clearly illustrated in Figs. 2 and 3. The slots 59 in the body extension 36 allow for movement of the means D relative to the body extension so that the rod 50 moves out of engagement with the latches 41, allowing the latches to move inwardly, thus releasing the plug closure 24 to move relative to the orifice member 23.

In the form of the invention illustrated, a spring 60 is provided to normally yieldingly urge the plug closure 24 downwardly or to the position where the plug 27 is in the aperture 26. We have illustrated the spring 60 surrounding the stem 28, and confined under pressure between the stop member 35 and the upper end of the head 40. The spring 60 is a light spring which does not interfere with the operation of the device, as hereinafter described.

When the device is to be employed specifically as a cleaner for acting in perforated casing, or the like, to clean the perforations thereof, it is desirable to provide it with a packer P, and with means for by-passing fluid from a point above the packer to the lower end of the device. In the drawings we have illustrated a packer F applied to the body extension 36. The packer includes, generally, a body or sleeve 65 of rubber or other suitable material adapted to normally bear outwardly against the wall of the casing 55. The packing sleeve 65 is protected by a suitable cage 66, in the manner common to devices of this character.

The means for by-passing fluid may include a fluid duct 67 connected through the wall of the body extension 36 at a point above the packer and extending downwardly through the body extension 36 to open through the plug 68 provided in the lower end of the body extension.

In operation, the device is lowered into the well with the plug 17 made tight to close the opening 16 with the closure 21 in place, and with the plug 27 in position closing the orifice 26. The plug is held in this position through the means C, the latches 41 of which are out in engagement with the shoulder 42, being held out by the rod 50, which is in an up position relative to the body of the device, and remains in this position, due to the resistance to downward movement in the casing established by the members 51. When the device has reached the desired point in the well, the operator moves it upwardly by withdrawal movement of the lowering tool, causing the body to move upwardly in the casing rela-

tive to the means D, which operation causes the rod 50 to move out of engagement with the latches 41, freeing the plug closure 24 to move relative to the orifice member 23. The body A having been lowered into the well completely closed, a considerable differential in pressure exists between the interior and exterior of the body, resulting in upward movement of the plug closure as soon as it is released. The plug closure moves upwardly from the position shown in Fig. 2 to that shown in Fig. 4, thus admitting fluid or material from the well into the body A through the tubular stem 28 and the openings 31. The material thus admitted into the body A is held therein by the check valve 19 so that it remains in the body as the device is removed from the well. As the device is removed from the well, excessive pressure within the device is relieved through the opening 14^a, and when the device reaches the top of the well, the operator may release the plug 17 and then remove the closure 21, allowing the contents of the body to freely discharge.

In the form of closure means B illustrated in Fig. 8, the plug 27^a is solid, or formed without packing means, while the orifice in which the plug operates is provided with packing means. In this case a packing ring 29^a is mounted or inserted in the wall of the aperture member 26^a (which may broadly be considered a part of the body member or a carrier for the ring), and ports 30 are provided to admit pressure from below the closure means to a space 9¹ behind the ring 29^a so that the ring is normally urged by such pressure into engagement with the plug 27^a. In this form of the invention, the stem 28^a may be of reduced diameter, in which case material enters the body A through the orifice 26^a and around the stem 28^a, rather than through the stem, as hereinabove described. In the present construction, when the plug 27^a has passed out of the orifice 26^a, pressure on the packing ring 29^a is neutralized so that it remains in proper working position and condition.

It will thus be seen that in Fig. 8, and considering orifice member 26^a a part of the body member or as a carrier for ring 29^a supporting the latter from the body, we have provided an arrangement wherein well pressure is effective to open the valve when it is released for upward movement and yet, when the closure member is held against opening movement, that same well pressure is effective to move an element (ring 29^a) carried by the body member into pressural engagement with the closure member (plug 27^a) to effect a tight seating. Thus, as the tool is lowered to greater depths, the increased leakage tendency due to increased well pressure is offset by the effect of the increased pressure exerted by the well fluid on ring 29^a.

Certain phases and portions of the structure above described are set forth and claimed in our copending application entitled Well tool, Serial No. 648,072, filed December 20, 1932, while other features, such for example, as the opening 16 and its control means, the opening 20 and its closure 21, and the check valve 19, are more fully set forth and are claimed in our copending application entitled Well baller, Serial No. 667,439 filed on even date herewith.

Having set forth only typical forms and applications of the invention, we do not wish to limit ourselves to the details hereinabove set out, but wish to reserve to ourselves various modifications, arrangements or applications that may appear

to those skilled in the art, and fall within the scope of the following claims.

Having described our invention, we claim:

1. A well device of the character described adapted to be attached to a lowering tool and including, a body forming a receptacle for material in a well and having an inlet opening, a closure for the opening adapted to be opened by the pressure of fluid in the well, means releasably holding the closure against opening movement, and a control for said means adapted to release said means by virtue of withdrawal movement of the lowering tool.

2. A well device of the character described including, a body forming a receptacle for material in a well and having an inlet opening, a plug slidably fitting the opening and adapted to be operated out of the opening by the pressure of material in the well, means mounted on the body for packing the plug in the opening, means releasably holding the plug in the opening, and a control for said holding means and adapted to release the holding means by virtue of predetermined movement of the device in the well.

3. A well device of the character described including, a body forming a receptacle for material in a well and having an inlet opening, a plug closure for the opening adapted to be operated out of the opening by the pressure of fluid in the well, a stem projecting downwardly from the plug in an extension of the body and being accessible through an opening in the extension of the body, and means coacting with the extension and the stem for releasably holding the stem against movement allowing the plug to move out of the inlet opening.

4. A well device of the character described including, a body forming a receptacle for material in a well and having an inlet opening, a plug closure for the opening adapted to be operated out of the opening by the pressure of fluid in the well, a stem projecting downwardly from the plug in an extension of the body and being accessible through an opening in the extension of the body, means for closing the opening in the extension of the body, and means coacting with the extension and the stem for releasably holding the stem against movement allowing the plug to move out of the inlet opening.

5. A well device of the character described including, a body to receive material from the well, a closure for the body operable to admit material into the body, and a control for the closure including a stem projecting from the closure and extending through the body, a latch carried by the stem and cooperating with the body to releasably hold the stem against operation, a member adapted to engage the latch to hold it in operating position, and a gripping member at the exterior of the body shiftable relative to the body and operatively connected with said member.

6. A well device of the character described including, a body to receive material from the well, a closure for the body operable to admit material into the body, and a control for the closure including a stem projecting from the closure and extending through the body, means limiting movement of the stem, a latch carried by the stem and cooperating with the body to releasably hold the stem against operation, a member adapted to engage the latch to hold it in operating position, and a gripping member at the exterior of the body shiftable relative to the body and operatively connected with said member.

7. A well device of the character described in-

cluding, a body to receive material from the well, a closure for the body operable to admit material into the body, and a control for the closure including a stem projecting from the closure and extending through the body, means normally yieldingly holding the stem in position when it holds the closure in operating position, a latch carried by the stem and cooperating with the body to releasably hold the stem against operation, a member adapted to engage the latch to hold it in operating position, and a gripping member at the exterior of the body shiftable relative to the body and operatively connected with said member.

8. A well device of the character described, embodying a body member having a chamber for the reception of well material, an inlet valve for said chamber, means releasably holding the valve closed, a control member carried by the body member and slidable axially thereof to effect release of said holding means, and a second control member operatively connected to the first control member and including an element extending exteriorly of the body and engageable with the side walls of the well; said valve, when the holding means is released, being movable to open position under the influence of well pressure.

9. In a well device of the character described, a tubular body member, an orifice member extending across the bore of the body member, said orifice member having a bore extending axially with respect to the body member, a tubular valve stem mounted for sliding movement axially of the body, a solid plug on one end of said stem and adapted normally to occupy and close off the bore of the orifice member, there being a port opening from said stem bore to the body bore at one side of said orifice member when the plug is in closing position, said stem being slidable to project the plug to the other side of said orifice member and to put said port into communication with the body bore at said other side.

10. In a well device of the character described, a tubular body member, an orifice member extending across the bore of the body member, said orifice member having a bore extending axially with respect to the body member, a tubular valve stem mounted for sliding movement axially of the body, a solid plug on one end of said stem and adapted normally to occupy and close off the bore of the orifice member, there being a port opening from said stem bore to the body bore at one side of said orifice member when the plug is in closing position, said stem being slidable to project the plug to the other side of said orifice member and to put said port into communication with the body bore at said other side, and an open-ended cage on said orifice at said other side adapted to receive the projected plug.

11. A well device of the character described including a body forming a receptacle for material in a well and having an inlet opening, a closure for the opening adapted to be moved from the opening by the pressure of fluid in the well, a stem projecting from the closure and positioned within the body and being accessible through a transverse opening in the body, and means coacting with the body and the stem for releasably holding the stem against movement allowing the closure to move from the inlet opening.

12. A well device of the character described including a body forming a receptacle for material in a well and having an inlet opening, a closure for the opening adapted to be moved

from the opening by the pressure of fluid in the well, a stem projecting from the closure and positioned within the body and being accessible through a transverse opening in the body, means for closing the transverse opening, and means co-acting with the body and the stem for releasably holding the stem against movement allowing the closure to move from the inlet opening.

13. In a well device of the character described, a body having a low-pressure chamber with a vertically extending inlet passageway at the bottom thereof, a plug valve normally positioned in the inlet passageway to close it and movable upwardly therethrough to open it, a depending stem on the valve, releasable latches acting between the body and stem to hold the valve against upward movement, and means for effecting release of said latches.

14. In a well device of the character described, a body having a low-pressure chamber with a vertically extending inlet passageway at the bottom thereof, a plug valve normally positioned in the inlet passageway to close it and movable upwardly therethrough and into the low-pressure chamber to open it, a depending stem on the valve, and releasable means acting between the body and stem to hold the valve against upward movement.

15. In a well device of the character described, a body having a low-pressure chamber with a vertically extending inlet passageway at the bottom thereof, a plug valve normally positioned in the inlet passageway to close it and movable upwardly therethrough and into the low-pressure chamber to open it, a depending stem on the valve, releasable means acting between the body and stem to hold the valve against upward movement, and means for effecting release of the holding means.

16. A well device of the character described adapted to be attached to a lowering tool and including a body having a low-pressure chamber with an inlet opening, a closure for the opening adapted to be opened by upward movement under the pressure of fluid in the well, means releasably holding the closure against opening movement, and a control for said holding means adapted to release said means by virtue of predetermined movement of the device in the well; said control means embodying a member operatively associated with the holding means and movable relatively downwardly with respect to the body to effect release of the holding means, and a gripping member operatively connected to the first mentioned member, said gripping member being shiftably mounted on the exterior of the body and engageable with the side walls of the well.

17. A well device of the character described adapted to be attached to a lowering tool and including a body having a low-pressure chamber with an inlet opening, a closure for the opening adapted to be opened by upward movement under the pressure of fluid in the well, means releasably holding the closure against opening movement, and a control for said holding means adapted to release said means by virtue of withdrawal movement of the lowering tool; said control means embodying a member operatively associated with the holding means and movable relatively downwardly with respect to the body to effect release of the holding means, and a gripping member operatively connected to the first mentioned member, said gripping member being shiftably mounted on the exterior of the body and engageable with the side walls of the well.

18. In a well device of the character described, a body having a low pressure chamber with an inlet opening, a closure for the opening adapted to be opened by the pressure of fluid in the well, means releasably holding the closure against opening, control means for the holding means and operable to release the holding means by virtue of predetermined movement of the device in the well; said control means including a gripping member movable relatively downwardly with respect to the body, said gripping member being shiftably mounted on the exterior of the body and engageable with the side walls of the well.

19. In a well device of the character described, a body having a low pressure, charge-receiving chamber with an inlet opening, a closure for the opening adapted to be opened by the pressure of fluid in the well, means releasably holding the closure against opening, control means for the holding means and operable to release the holding means by virtue of predetermined movement of the device in the well, and a charge-retaining valve for the chamber and effective after the inlet has been opened.

20. A well device of the character described adapted to be attached to a lowering tool and including, a body forming a receptacle for material in a well and having an inlet opening, a closure for the opening adapted to be opened by the pressure of fluid in the well, means releasably holding the closure against opening movement, a control for said means adapted to release said means by virtue of withdrawal movement of the lowering tool, and a charge-retaining valve in the receptacle and effective after the closure has been opened.

21. A well device of the character described, embodying a body member having a chamber for the reception of well material, an inlet valve for said chamber, means releasably holding the valve closed, a control member carried by the body member and slidable axially thereof in one direction to release said holding means, and a second control member operatively connected to the first control member and including an element extending exteriorly of the body and engageable with the side walls of the well; said valve, when the holding means is released, being movable to open position under the influence of well pressure; and a charge-retaining valve for the chamber and effective after the inlet valve is opened.

22. In a well device of the character described, a body member having a low-pressure chamber with an inlet, a closure member for the inlet adapted to be moved by the pressure of fluid in the well to open the inlet, releasable means holding the closure member from opening movement, and an element carried by one of the members and movable under the influence of said pressure into pressural engagement with the other member when the closure member is in inlet-closing position.

23. In a well device of the character described, a body member having a low-pressure chamber with an inlet, a closure member for the inlet adapted to be moved by the pressure of fluid in the well to open the inlet, releasable means holding the closure member from opening movement, and a resilient packing element carried by one of the members and exposed to said well pressure in a manner whereby it is pressurally engaged with the other member when the closure member is in inlet-closing position.

24. A well device of the character described

including, a body forming a receptacle for material in a well and having an inlet opening, a plug slidably fitting the opening and adapted to be operated out of the opening by the pressure of material in the well, means mounted on the 5 body for packing the plug in the opening, said packing means embodying a ring having its outer face exposed to well-fluid in a manner whereby said fluid is effective to radially compress the 10 ring about the plug when the plug is in said opening, means releasably holding the plug in the opening, and a control for said holding means and adapted to release the holding means by virtue of predetermined movement of the device 15 in the well.

25. A well device of the character described

adapted to be attached to a lowering tool and including, a body forming a receptacle for material in a well and having an inlet opening, a closure for the opening adapted to be opened by the pressure of fluid in the well, means releasably 5 holding the closure against opening movement, fluid-pressure-actuated means for effecting a tight closure between the closure and the body member at the inlet opening when said closure is held against opening movement, and a control 10 for said means adapted to release said member by virtue of withdrawal movement of the lowering tool.

CECIL H. SWEET.
WELDON C. ERWIN. 15