R. M. GALBRAITH.

MEANS FOR SETTING WELL STRAINERS.

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Fig. 1.

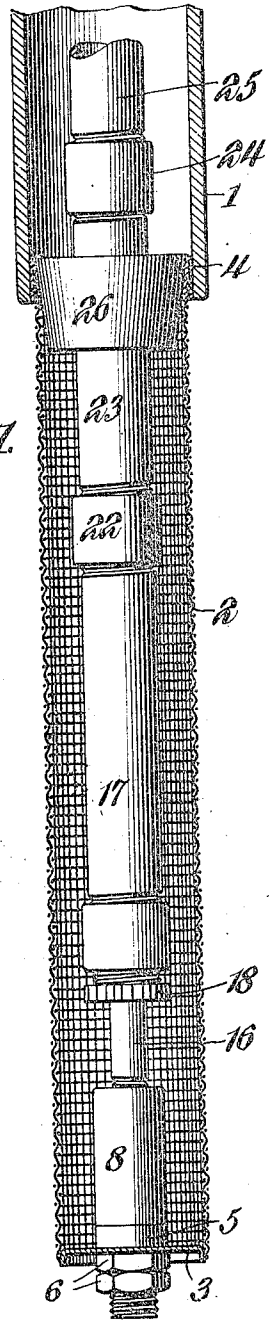


Fig. 3.

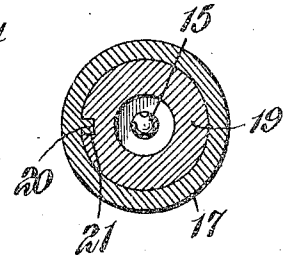


Fig. 4.

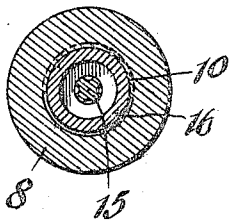


Fig. 5.

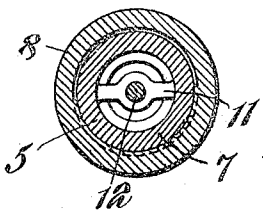
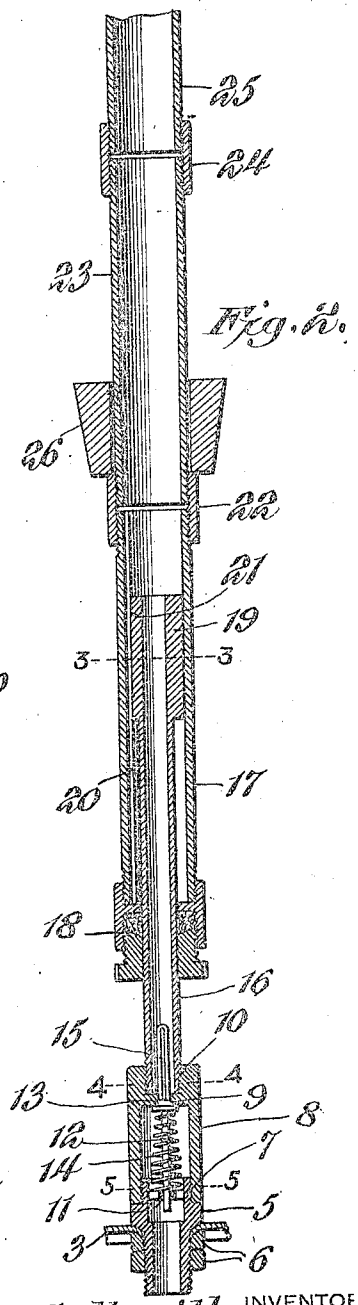


Fig. 2.



WITNESSES

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MEANS FOR SETTING WELL-STRAINERS.

1,042,425. Specification of Letters Patent. Patented Oct. 29, 1912.

Application filed July 16, 1912. Serial No. 709,745.

To all whom it may concern:

Be it known that I, ROBERT M. GALBRAITH, a citizen of the United States, residing at Pine Bluff, in the county of Jefferson and State of Arkansas, have invented a new and useful Means for Setting Well-Strainers, of which the following is a specification.

This invention has reference to improvements in means for setting well strainers and is designed to provide a device whereby a strainer may be installed in a well casing without disturbance of the latter.

It is customary in wells of certain characters to sink the well casing to the water bearing strata, and then to lift the casing a short distance sufficient to provide for the insertion of the strainer, but the lifting of the casing is often a difficult job because of the settling of earth and sand about the casing.

In accordance with the present invention the well casing is inserted to the desired extent and then the strainer is introduced into the well casing to the bottom thereof, and by means of a water jet a passage for the strainer is bored into the water bearing sand and the strainer is lowered until its upper end is within the well casing but for a short distance, and then by means of a swage on the manipulating means for the strainer the upper end of the strainer is expanded against the casing until in tight engagement therewith, thereby preventing the entrance of sand into the strainer where joining the casing, while the lower end of the strainer is initially closed.

The invention will be best understood from a consideration of the following detailed description, taken in connection with the accompanying drawings forming a part of this specification, with the further understanding that while the drawings illustrate a practical form of the invention, the latter is susceptible of other practical embodiments, and, therefore is not confined to any strict conformity with the showing of the drawings, but may be changed and modified so long as such changes and modifications mark no material departure from the salient features of the invention.

In the drawings:—Figure 1 is a longitudinal diametric section of a casing and strainer with the placing means in elevation. Fig. 2 is a longitudinal diametric section of the strainer placing means with the strainer and casing omitted except that a small portion of the lower closure for the strainer is shown in the figure. Fig. 3 is a section on the line 3—3 of Fig. 2 but drawn to a larger scale. Fig. 4 is a section on the line 4—4 of Fig. 2, but drawn to a larger scale. Fig. 5 is a section on the line 5—5 of Fig. 2 but drawn to a larger scale.

Referring to the drawings, there is shown a well casing 1, which is assumed to be sunk to the proper depth. There is also shown a strainer 2, the showing being to a large extent typical rather than illustrative of any particular structure, since the strainers may vary considerably in structure, and the showing of Fig. 1 is therefore to be taken as simply indicative of any appropriate form of strainer. That end of the strainer which in the installed strainer constitutes the lower end is provided with a closure 3 and about the other or upper end of the strainer there is applied a band 4 of some readily expansible material, such as lead.

Extending through the closure 3 is a nipple 5 secured to the closure by nuts 6 or in any other suitable manner. The nipple 5 is provided with a threaded extension 7 to which is applied a hollow cap member 8 having the end remote from that applied to the nipple 5 reduced in diameter and formed with a valve seat 9 and a threaded socket 10, both in the longitudinal axis of the cap member. The threaded extension 7 of the nipple 5 has an interior spider 11 through which there is extended a valve stem 12 carrying at one end a valve 13 adapted to the seat 9, and surrounding the valve stem is a spring 14 between the spider 11 and the valve 13 and tending at all times to maintain the valve against the seat 9. The valve 13 is provided with the usual axial guide extension 15 of externally grooved form, so that when the valve is opened fluid may pass the seat.

Adapted to the threaded socket 10 is one end of a pipe 16, the threads of both the pipe and the socket being left-handed threads. This pipe enters another and larger pipe 17 through a packing gland 18 and the end of the pipe 16 remote from the threaded end is expanded into a head 19 of a size to fit snugly, yet freely within the pipe 17, which latter is provided on its interior with a longitudinal spline 20, while

the head 19 has a corresponding longitudinal groove 21. This structure permits the pipe 16 to move lengthwise of the pipe 17 or the said pipe 17 to move lengthwise of the pipe 16, as the case may be, but any turning movement of the pipe 17 is participated in by the pipe 16 because of the spline connection between the two pipes. The pipe 17 is in the particular construction shown of considerably less length than the strainer 2 and is connected by a plain, straight coupling 22 to another length of pipe 23, and the latter is connected by a plain, straight coupling 24 to still another pipe 25, and the latter is assumed to be of a length to extend to the top of the well and may be of an appropriate number of sections for the purpose. Surrounding the pipe 23 between the couplings or collars 22 and 24 is a frusto-conical annular swage block 26 with the smaller end presented toward the coupling or collar 22 and the larger end toward the coupling or collar 24. This swage block is made to fit freely on the pipe 23, so as to move lengthwise thereof without material impediment.

Assuming that the casing 1 has been sunk to the desired extent, the strainer 2 attached to the nipple 5 and the other parts connected together as shown in the drawings are lowered into the casing until the nipple 5 reaches the lower end of the casing, which is further assumed to be at the water bearing sand stratum. Now water is forced through the pipe 25 into the pipe 23 and from thence into the pipe 17, where it finds its way through the head 19 into the pipe 16, the bore of the pipe 16 being continued through said head and the force of the water displaces the valve 13, so that the water under pressure flows into the cap 8 and thence into the nipple 5 and out through the latter into the sand stratum. The water jet thus produced bores its way into the sand, so that the strainer 2 may follow until the upper end of the strainer is close to the lower end of the casing, when the lowering of the strainer may cease. Even though the pipe 17 be under these conditions withdrawn from the pipe 16 until further movement is arrested by the engagement of the head 19 with the packing gland 18, the swage block 26 will be in gravital engagement with the lead ring 4. If, now, the pipe 25 with the pipes 23 and 17 be allowed to drop by their own weight, or be forced downwardly along the pipe 16, the collar or coupling 24 will be brought into forcible engagement with the larger and then upper end of the swage block, and the latter because of its taper form will engage and expand the ring 4 into forcible contact with the casing. The operation of lifting the pipe 25 and permitting it to fall, or forcing it downward may be repeated a suitable number of times until the ring 4 has been expanded by swaging tightly against the inner wall of the casing 1, so that the strainer is not only sustained by such engagement, but the entrance of sand in the casing at the upper end of the strainer is prevented. After the operation just described has been completed, the pipe 25 with the parts carried thereby may be lifted until the collar 22 disengages the swage block from contact with the expanded upper portion of the strainer, and then by turning the pipe 25 in a right handed direction, the pipe 16 is readily unscrewed from the cap 8, all the other screw connections of the device being by right hand threads. When this is accomplished the whole device with the exception of the nipple 5 and cap 8 with the valve 13 therein, is removed from the well, the valve structure carried by the nipple 5 remaining permanently in the well and serving to close the lower end of the strainer against the entrance of sand, the spring 14, which may be a light spring, being sufficiently strong to hold the valve in the closed position.

What is claimed is:—

1. A means for setting well strainers comprising a carrying means for the strainer having a telescopic section, a swage block on said carrying means in position to engage the upper end of the strainer when in place to expand it against a well casing, and means on the strainer carrying means for engaging the swage block to force it into contact with the strainer.

2. A means for setting well strainers in well casings with the strainer provided with a check valve at the lower end and an expansible collar at the upper end, comprising a pipe section having left hand threads at one end adapted to screw into the check valve structure, the other end of the pipe being formed into a laterally expanded head, another pipe receiving the first named pipe in telescoping relation thereto, the second named pipe and the head of the first named pipe having a spline and groove connection for constraining the two pipes to rotate together, a third pipe connected to the second pipe and having collars at both ends, and a taper block on and slidable along the third pipe between the collars to be engaged by the latter, said taper block being shaped to expand the expansible collar at the upper end of the well strainer into engagement with the interior of the well casing.

3. A means for attaching well strainers to the lower ends of installed well casings, comprising a tubular carrier for the strainer provided with a check valve attached to the lower end of the strainer with the tubular support in readily removable relation to the check valve, said check valve ter-

minating in a nozzle for the production of a water jet beyond the lower end of the strainer when at the lower end of the casing, and means on the strainer support for expanding the upper end of the strainer against the inner wall of the lower end of the casing.

4. A means for attaching well strainers to the lower ends of installed well casings comprising a tubular carrier for the strainer provided with a check valve attached to the lower end of the strainer with the tubular support in readily removable relation to the check valve, said check valve terminating in a nozzle for the production of a water jet beyond the lower end of the strainer when at the lower end of the casing, and block on the strainer support for swaging the upper end of the strainer against the inner wall of the lower end of the casing, the carrier being provided with a telescoping portion between the swage block and the check valve and with engaging means for the swage block in spaced relation one to the other and on opposite sides of the swage block.

5. A means for attaching well strainers to well casings after the installation of the casing, comprising a carrier for the strainer provided with a swage block in position to expand the upper end of the installed strainer against the inner wall of the lower portion of the casing, said carrier having a telescoping portion for permitting longitudinal movement of the carrier with respect to the strainer, and with means for engaging the swage block for delivering blows thereagainst to effect the expansion of the strainer.

In testimony, that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

ROBERT MILLER GALBRAITH.

Witnesses:

J. E. BOYCE,

C. H. BOLINGER.