

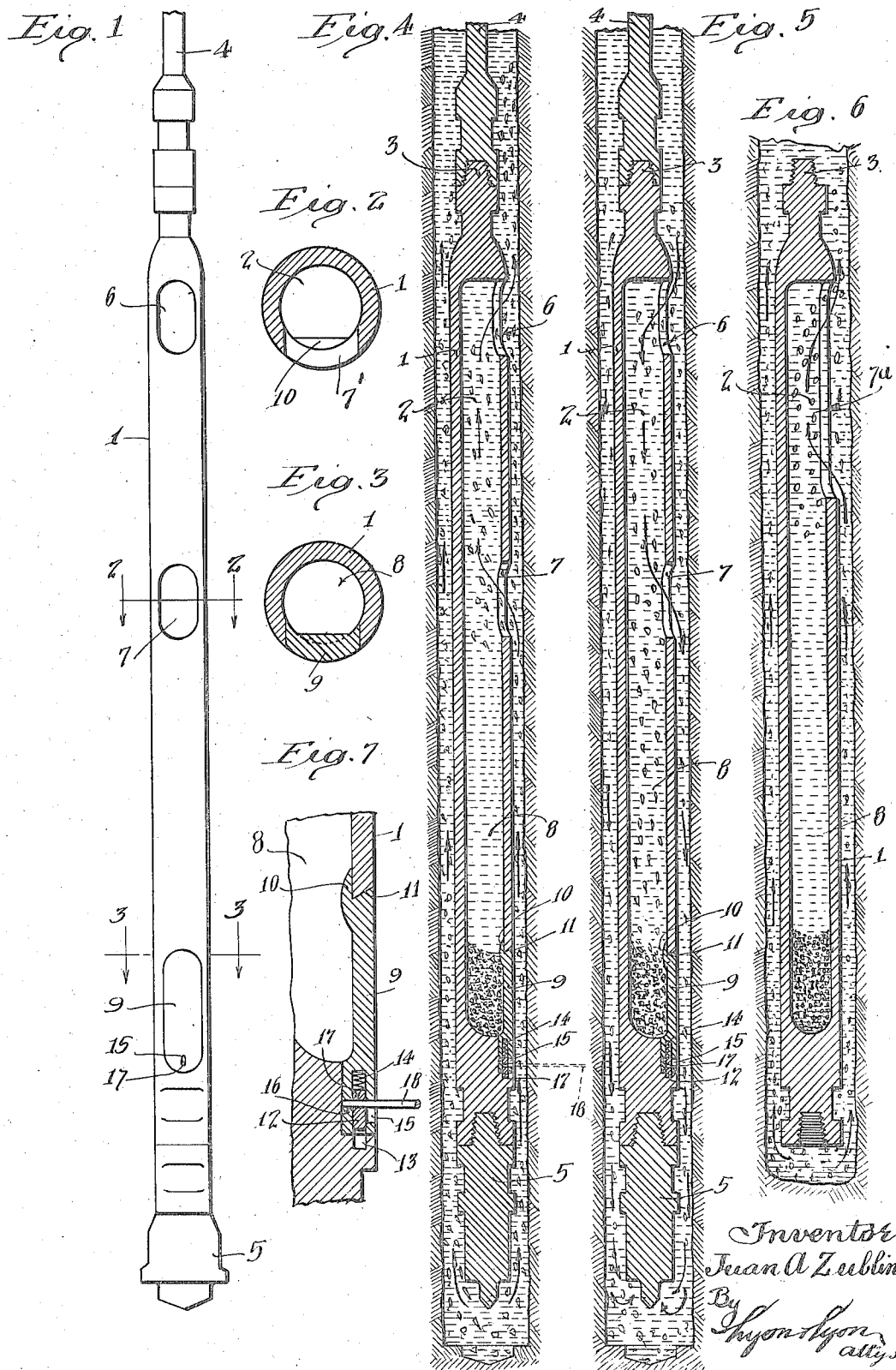
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MEANS FOR BAILING DETRITUS FROM A WELL BORE.

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UNITED STATES PATENT OFFICE.

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MEANS FOR BAILING DETRITUS FROM A WELL BORE.

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To all whom it may concern:

Be it known that I, JUAN A. ZUBLIN, a citizen of the Republic of Switzerland, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Means for Bailing Detritus From a Well Bore, of which the following is a specification.

This invention relates to a method and means for bailing detritus from a well bore and is particularly directed to means especially adapted for use in connection with the reciprocatory type of well equipment.

An object of the invention is to provide a method of bailing detritus from a well by creating a condition effecting a suspension of the detritus in flowing water and separating the detritus from the water and depositing it in a zone of quiet out of the path of the flowing water.

A further object is to provide a method creating a flow of water at high velocity for carrying the detritus in suspension, reducing the velocity in a zone of increased area above a storage pocket to permit the detritus to gravitate into the pocket out of the path of the circulating water.

Another object of the invention is to provide an improved type of bailer in which the material to be removed from a well is deposited in the bailer by the action of the circulating water and is thereafter retained in the bailer out of the path of circulation.

Another object is to provide a bailer of the above type in which a separation of the material from the water in circulation is effected, and in which such separation is due to the specific gravity of such material and the reduction in the velocity of the circulating water at the zone of separation.

Another object is to provide a bailer in which the material deposited in the storage pocket thereof at each stroke is not subsequently subjected to the action of the circulating water.

Another object is to provide a bailer devoid of moving parts and which is exceedingly simple and durable in construction and efficient in operation.

A further object is to provide a bailer adapted for use in connection with a drill in a well drilling operation.

Various other objects and advantages will be more fully apparent from the following description of the accompanying drawings which form a part of this disclosure, and

which illustrate a preferred form of embodiment of the invention.

Of the drawings:

Fig. 1 is an elevation of my improved bailer with a drill connected thereto.

Fig. 2 is a section on line 2—2 of Fig. 1.

Fig. 3 is a section on line 3—3, of Fig. 1.

Fig. 4 is a vertical section through the bailer in a well hole illustrating the action on the down stroke.

Fig. 5 is a similar section illustrating the action on the up stroke.

Fig. 6 is a vertical section through a bailer of slightly modified form in position in a well bore, illustrating the use of the bailer in a simple bailing operation.

Fig. 7 is an enlarged detail section illustrating the details of the discharge port and the closure therefor.

The bailer of the present invention is designed to be used for ordinary bailing purposes, that is, for the purpose of removing sand or other detritus material from a well bore, and also is designed for connection to a drill bit to function as a receiver of the detritus during a drilling operation.

The mode of operation in each instance comprises a reciprocation of the device to impart motion to the circulating water to keep the detritus in suspension and impart a relatively high velocity thereto to convey the detritus to the receiving opening of the bailer where said velocity is reduced and a gravity separation is effected.

As illustrated, my improved bailer consists of an elongated cylinder 1 having a central chamber 2, a screw-threaded pin 3 at its upper end for attachment to an element 4 of a tool string or cable, and a screw-threaded recess at its lower end to receive the screw-threaded pin of a drill bit 5.

The top and bottom ends of the chamber 2 are closed and the side wall of the bailer is provided with an upper opening 6 and a lower opening 7 longitudinally spaced therefrom. the chamber extending downwardly from said second opening to form an imperforate storage pocket 8 in which the detritus is stored for removal from the well bore.

Upon withdrawal of the bailer from the well bore the stored detritus in the pocket is removed in any desired manner. For instance, the detritus may be flushed out by a relatively high pressure stream of water or steam, or the bailer may be provided with a removable wall section at the base of the

pocket, as illustrated, and the removal of said wall section providing an opening at the base of the pocket through which the detritus may be removed.

5 The upper end of said wall section 9 is provided with a lip 10 engaging the inner surface of the wall of the pocket, and the wall and the section 9 have cooperating beveled edges as at 11, this structure preventing lateral displacement of the upper end of the section 9. The lower end of the section 9 engages a recess in the body of the bailer and is provided with a spring plunger 12 engaging into a recess 13 to lock 10 the section 9 in place, the spring 14 being preferably of sufficient tension to forcefully hold the section upwardly. On one side of the plunger the section 9 has an elongated slot 15 and on the opposite side an orifice 16 transversely aligned with the upper end of said slot. The plunger 12 has a transverse orifice 17 and in a removal of the section 9, a bar or other suitable tool 18 is inserted through the slot 15 and into the orifice 17 in the plunger 12, as indicated in dotted lines in Fig. 4. The plunger is then elevated out of the recess 13 and the rod 18 pushed inwardly to engage into the orifice 16, as in Fig. 7, to hold the plunger retracted while the section 9 is removed and until it is again desired to lock the section in place.

If desired the bailer may be constructed as shown in Fig. 6, and in such construction I provide a single elongated opening 7^a in place of the two openings 6 and 7 previously referred to in connection with the form illustrated in Figs. 1 to 5. Also in Fig. 6 I have shown a bailer which has no removable wall section such as the section 9 previously described. In a bailer of this type the separating action is the same as in the bailer having two openings, and the removal of the contents of the storage pocket will preferably be effected by directing a relatively high pressure stream of water or steam to flush out the detritus or the bailer may in some instances be turned upside down and the contents of the pocket then removed either manually or by flushing.

In setting forth the several advantages resulting from the use of the bailer herein disclosed, the functions thereof will first be explained in its use in connection with a drill bit and during a drilling operation, and with particular reference to Figs. 4 and 5.

In the well known impact well drilling system now in general use which utilizes the walking beam, drill cable, and impact drill bits operating in the presence of circulating flushing water, the drilling progress is very slow. The bottom of the bore is disintegrated into pieces of various size by the

heavy blows of the drill tool and the detritus must be removed by the circulating water while the drill is in operation, or periodically by other means after first removing the drilling tool from the bore. At least in the removing of the detritus by the so-called mud-water circulating system the detritus must be reduced to a fineness which will permit the water to carry the particles to the surface, and as the circulation of the water is relatively sluggish only the very fine particles will be carried in suspension to the surface. Therefore, in reducing the detritus to nearly powder form a major portion of the drilling effort is absorbed in the grinding of the detritus instead of in the boring of the hole.

Considering further that during the grinding of the material additional uncrushed pieces are continuously being broken from the bottom wall it follows that the hole can never be completely cleaned out by the flushing system, and from this it will be evident that the tool always first strikes a pillow or cushion of detritus and can never hit the bottom wall with its full power.

The difference in specific weight between water, and shale, stone, etc., which averages one to two and one-half, makes it impossible to lift particles of these materials of any appreciable size in quiet or slowly circulating water, but where a stream of water of appreciable velocity is available particles of considerable size may be lifted without difficulty.

With the above in mind I have provided a bailer carrying a drill bit and which during the down stroke forces the water and suspended detritus upwardly between the bailer and the wall of the well bore at a relatively high velocity and during the upstroke creates a heavy suction drawing the water and suspended detritus downwardly at a relatively high velocity. By this action the water and detritus is kept in a highly agitated state and is forced upwardly and downwardly past the bailer at high velocity.

Now considering the fact that when a stream of water flowing at high velocity in a restricted space is released into a zone of greatly increased area its velocity is greatly decreased, it will be pointed out that on the down stroke of the bailer the water travels upwards at high velocity in the restricted space between the bailer and the wall of the bore until it reaches the opening 7 where it then encounters a zone of increased area, that is an area equal to the aforesaid area between the bailer and wall of the bore and the area of the chamber 2, and in flowing through this zone of increased area its velocity is greatly diminished. During the up stroke of the bailer this same decrease in velocity is effected and it is during such de-

crease of velocity and in the zone of increased area that the separation of the detritus from the circulating water is effected, and in the following manner.

5 First, as the water with the detritus in suspension passes through the restricted area between the relatively smooth wall of the bailer and the relatively rough wall of the well bore, the difference in the resistance offered by said walls to the flow will tend to force the detritus radially against the wall of the bailer thereby causing the detritus to more readily enter the opening 7 on the down stroke or reversely, the opening 6 on the up stroke of the bailer, and further as the area of the respective opening is reached the water taking the path of least resistance will tend to flow through the chamber between the two openings, as indicated by the arrows. On each of the two dead points of the walking beam the water comes to a stand still previous to its change in direction of flow and during such times the detritus then within the chamber 2 settles down into the storage pocket. On the up stroke of the bailer the detritus carried downwardly into the chamber 2 will be forced into the pocket where it is retained out of the path of flow of the water.

30 After a period of time the pocket will become fully charged with detritus free from surplus water and the bailer will then be removed from the well and the pocket emptied.

35 Fig. 6 illustrates the use of the bailer without the attached drill bit and in this case is primarily used for the purpose of cleaning out a hole which has been completed or for removing sand or other material entering the well by accident or otherwise.

Also in Fig. 6 I have illustrated a bailer in which the wall between the two openings has been removed to form a continuous elongated opening. Such modification has no appreciable effect on the operation and in some cases will be preferable as it permits a pocket of greater capacity to be formed in a bailer of a given length.

50 While the form of device here shown and described, is well adapted to fulfill the objects primarily stated, it is to be understood that it is not intended to confine the invention in this regard, as it is susceptible of 55 embodiment in various other forms, all

coming within the scope of the claims which follow.

I claim:

1. A chambered well bailer having closed top and bottom ends with its side wall provided with an opening and the chamber extending below said opening to provide a storage pocket. 60

2. A chambered well bailer having closed top and bottom ends with its side wall provided with an opening and the chamber extending below said opening to provide an imperforate storage pocket. 65

3. A chambered well bailer having closed top and bottom ends with its side wall provided with an opening and the chamber extending below said opening to form a storage pocket, and means permitting a removal of the stored material from the pocket. 70

4. A chambered well bailer having closed top and bottom ends with its side wall provided with an opening and the chamber extending below said opening to form a storage pocket, the bottom end of the bailer being formed for attachment to a well drill. 75

5. A chambered well bailer having closed top and bottom ends with its side wall provided with an opening near the upper end of the chamber and a second opening spaced downwardly from said first opening and the chamber extending below the second opening to form a storage pocket. 80

6. A chambered well bailer having closed top and bottom ends with its side wall provided with an opening near the upper end of the chamber and a second opening spaced downwardly from said first opening and the chamber extended below the second opening to form an imperforate storage pocket. 85

7. A chambered well bailer having closed top and bottom ends with its side wall provided with an opening near the upper end of the chamber and a second opening spaced downwardly from said first opening and the chamber extended below the second opening to form a storage pocket, and means permitting a removal of the stored material from the pocket. 90

Signed at Los Angeles, California, this 105 16th day of December, 1921.

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Witnesses:

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