

June 16, 1936.

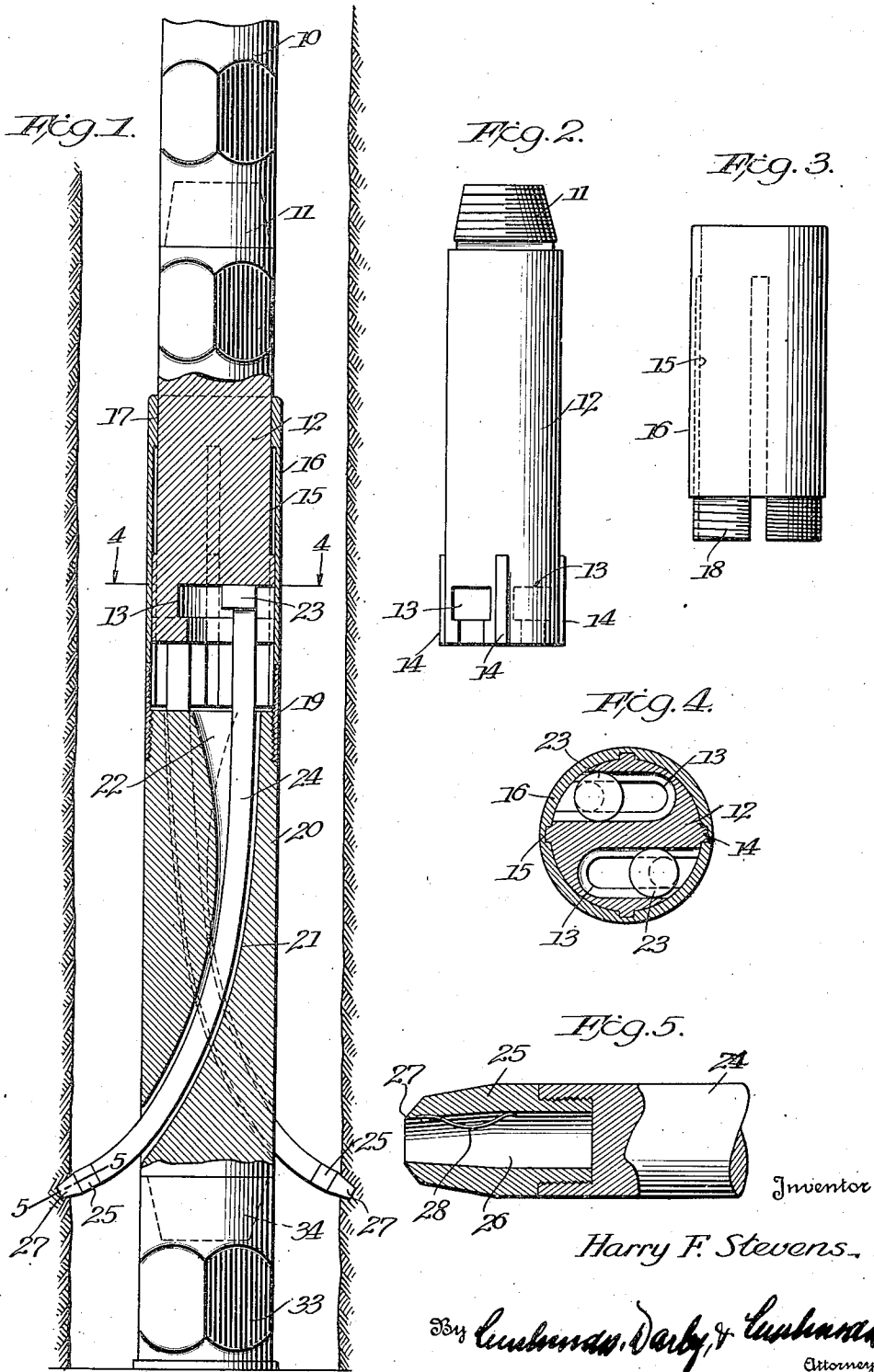
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2,044,648

SIDEWALL FORMATION SAMPLER

Filed Aug. 2, 1934

2 Sheets-Sheet 1



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Fig. 6.

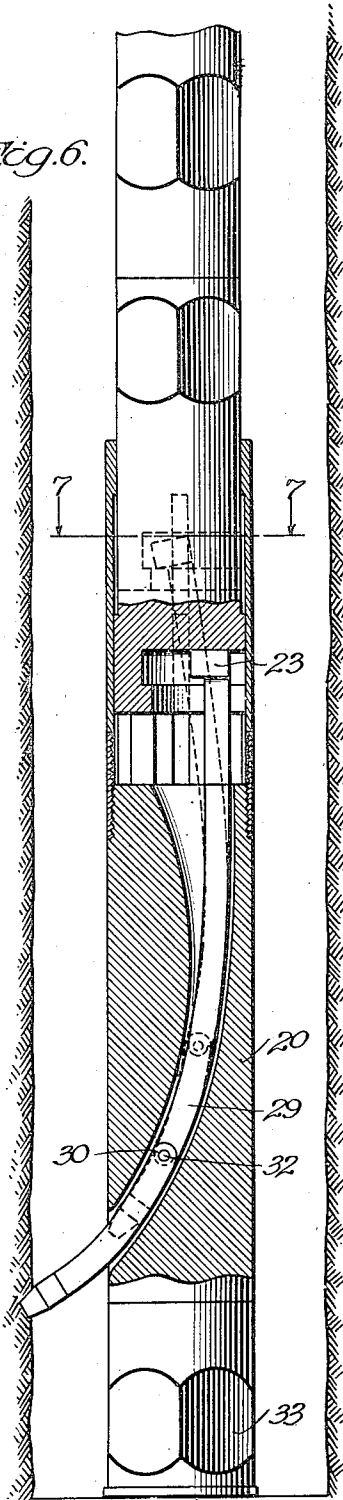


Fig. 7.

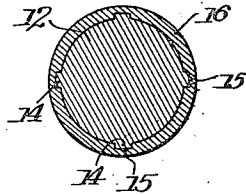


Fig. 8.

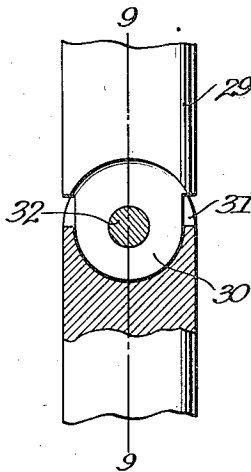
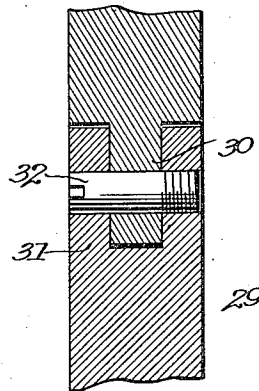


Fig. 9.



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## UNITED STATES PATENT OFFICE

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## SIDEWALL FORMATION SAMPLER

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13 Claims. (Cl. 255—1)

The present invention relates to oil well tools, particularly what is known as sampling tools, designed to take samples from a well, being particularly designed to take the samples from the side walls of the well.

In the drawings herewith I have illustrated my invention, and it will be understood that the drawings and specification are illustrative and in no sense descriptive of my invention, as it may be varied mechanically within a wide range.

In the drawings:

Figure 1 is a view of my tool, the parts being in section for clearness of illustration.

Figure 2 is a view in elevation of my tool actuating head.

Figure 3 is a view in elevation of the tool carrier member.

Figure 4 is a transverse view substantially on the line 4—4 of Figure 1, looking in the direction of the arrows.

Figure 5 is a view of a sampler head fixed to the end of the tool.

Figure 6 is a view, partly in section, showing a slightly modified form of tool.

Figure 7 is a view substantially on the section line 7—7 of Figure 6, showing the grooves in the casing for the tool actuating head.

Figures 8 and 9 are views of one form of tool joint to permit bending or breaking of the tool between its ends.

Referring to the drawings by numbers, like numbers indicating like parts in the several views, 10 indicates any string of tools of any usual or desired type for manipulating the sampler of my invention, which will be suitably secured as by the screw joint 11 to the tool actuating head.

The tool actuating head 12, connected with the string 10, is provided at its lower end with slots 13 preferably, as here shown, undercut and reversely placed so that, as shown in Figure 4, they are placed in opposite relation to one another and open outwardly through the wall of the head member. The tool actuating head is provided on its outer surface, as here shown at its lower end, with ribs 14 which engage grooves 15 in a casing member 16 in which the tool actuating head 12 has limited movement, the head 12, as shown in Figure 1, being in sliding engagement with the casing and fitting closely the flange 17 at the end of the casing so that a close relation of the parts is provided and foreign matter which would tend to clog movements of the assembled parts is excluded.

At its lower end, the casing 16 is threaded at

18, as shown in Figure 3, and designed to be engaged with the collar 19, which collar is provided with right and left hand screws so as to couple casing 16 to a tool carrying member 20, threaded at its upper end for engagement with the collar 19.

The tool carrying member is provided with a plurality of tool passes 21 which, as here shown, extend from one end of the tool in a curvilinear path to a side wall of the tool near its opposite end. The passes 21 are widened at their ends 22 so as to permit proper movement of the sampling tools as the device is manipulated. Provision may be made for one or more tools in this assembly, two being shown in Figures 1 and 4.

Mounted in the slots 13 of the tool actuating head 12 are the enlarged ends 23 of the sampler tools 24. The end 23 of the tool engages the undercut slots 13 so that the tool will be retained for reciprocating movements in the head, and furthermore the enlarged end 23 of the tool 24 may shift transversely or laterally in the slot as it shifts during its longitudinal movement in the widened portion 22 of the tool pass 21.

The tool 24, as here shown, is curvilinear and follows the curved passes 21 so that it may be projected through the side wall opening as shown, and is reciprocated as the head 12 shifts longitudinally of the casing 16, the ribs 14 and grooves 15 serving to hold the head 12 in the casing 16 in the proper alignment so that there can be no rotary shifting and jamming of the tool. As the head 12 is raised and lowered in the casing 16, the tools 24 will be positively moved longitudinally of the tool carrier member 20 and alternately thrust out of the side walls of the member 20 so that the sampler heads 25 will engage a wall to take the sample, and will then be retracted within the carrier member 20 and the device may then be withdrawn and the samples secured.

The sampler heads 25 are removably mounted on the tools 24 as shown in Figure 5, the removable connection here shown being a screw-threaded connection. The sampler head will have a chamber 26, here shown as a bore extending completely through the head, although it may be otherwise formed, and it will be provided at its outer end with a sample cutter 27 of any suitable formation. In order to retain the sample in the chamber 26, the diameter of that chamber at the cutter end 27 will be of the smallest diameter so that as the sample is cut, it will be thrust back into the increased diameter of the chamber and retained by the contraction of

the chamber at the cutter end. If desired, additional means for retaining the sample may be provided, one convenient means here shown being the spring 28 secured to the wall of the chamber 26, which spring 28 will be compressed as the sample enters the chamber and hold it securely in place.

In some instances, it may be desirable to provide means for straightening or bending the sampling tool, and in Figures 6, 8 and 9, I have shown one form of tool by which this may be accomplished, although it will be understood that this construction may be varied and other equivalent means provided.

The tool 29, as shown in Figure 6, is provided between its ends with a bendable or breakable joint 30, the joint here shown being a hinge joint of the ordinary rule type and comprising the hinge engaging parts 30 and 31 held by hinge pin 32.

With this construction, a tool of very considerable length may be manipulated, for it will be seen, as shown in full and dotted lines in Figure 6, that the curved tool 29 may be carried down through the curvilinear passage so as to have an extended projection from the side wall opening of the curvilinear passage, and when retracted to its extreme upward position, the tool will bend or break as it reaches the widened upper end of the curvilinear passage so as to permit the upper portion of the tool to move upwardly in a substantially vertical line, the joint 30 breaking as it reaches the widened portion of the curvilinear passage, thus avoiding the necessity of providing for extreme transverse or lateral shifting of the upper enlarged end of the tool 29 in the slots in the tool actuating head.

The end of the carrier member 20 will preferably be provided with a foot portion 33, which will be connected in any suitable manner, as by a screw member 34, so that as the apparatus is lowered into the hole, the foot will rest upon the bottom and serve as a foundation for the manipulation of the sampler.

It will be understood, of course, that this sampler can be used to take samples at any depth desired, as it may be manipulated not only at the bottom of the hole, but at any point in its length. It is only necessary to provide means for arresting further downward movement of the member 20 at the desired point in the hole.

In assembling the sampler tool, the tool actuating head 12 will be inserted in the casing 16 with the ribs 14 engaging the grooves 15, the tools 24 having been engaged in the slots 13 in the tool actuating head 12. The collar 19 will be brought into proper relation to the casing 16 and the carrier member 20 then engages with the sampler tools 24 properly entered into tool passes 21. When the carrier member 20 is in proper relation to the screw collar 19, that will be turned and the right and left hand screws will draw together casing 16 and the carrier member 20 in the proper relation.

The foot 33 will then be engaged with the lower end of the carrier member 20 and the string 10 coupled with the upper end of the tool actuating member 20. The tools will have the sampler heads 25 attached at their lower ends in position to engage the walls as the tools are manipulated. When the samples have been taken and the rig withdrawn from the hole, the sampler heads 25 can be removed and the samples secured.

It will be understood that such variations from the mechanical expedients, here shown for car-

rying out my invention, as fall within the range of mechanical skill, may be made without departing from the purview of my invention.

I claim:—

1. In a device of the class described, the combination of a carrier member having a pass, a tool capable of free bodily movement longitudinally in said pass, a sampling head carried at the outer end of said tool, a tool engaging head having a slot to permit lateral shifting of said tool connected therewith and movable relative to said carrier member positively to move said tool longitudinally in said pass.

2. In a device of the class described, the combination of a carrier member having a tool pass extending from the inner end of said carrier to the side wall thereof and having a transversely widened inner end, a tool capable of free bodily movement longitudinally and bodily shiftable laterally in said pass and having an enlargement at its inner end and a sampling head at its outer end, a tool engaging head having a transverse slot to engage the enlargement of said tool end to permit lateral shifting thereof, said tool engaging head being movable relative to said carrier member positively to move said tool in said pass.

3. In a device of the class described, the combination of a carrier member having a tool pass extending from the inner end of said carrier to the side wall thereof and having a transversely widened inner end, a tool capable of free bodily movement longitudinally and bodily shiftable laterally in said pass and having an enlargement at its inner end and a sampling head at its outer end, a tool engaging head having an undercut transverse slot to engage the enlargement of said tool end to permit lateral shifting thereof, said tool engaging head being movable relative to said carrier member positively to move said tool in said pass.

4. In a device of the class described, the combination of a carrier member having a plurality of tool passes extending therethrough, said passes having transversely widened inner ends, a plurality of tools capable of free bodily movement longitudinally and bodily shiftable laterally in said passes, a head movable relatively to said carrier member and having means to engage and permit lateral shifting of the ends of the tools to move said tools positively in said passes.

5. In a device of the class described, the combination of a carrier member having a plurality of tool passes extending therethrough, said passes having transversely widened inner ends, a plurality of tools capable of free bodily movements longitudinally and bodily shiftable laterally in said passes, a tool-engaging head having reversely placed offset slots to engage the inner ends of said tools positively to move said tools in said passes.

6. In a device of the character described, the combination of a carrier member having a pass extending from one of its ends to a side wall thereof, a tool capable of bodily movement longitudinally in said pass, a sampling head carried at the outer end of said tool, said pass being widened at its inner end to permit lateral shifting of said tool therein, means engageable with said tool and movable relative to said carrier member to move said tool longitudinally in said pass, said tool shifting laterally in said pass during said longitudinal movement.

7. In a device of the character described, the combination of a carrier member having a curvi-

linear pass extending from one of its ends to a side wall thereof, a tool capable of bodily movement longitudinally in said pass, a sampling head carried at the outer end of said tool, said pass being widened at its inner end to permit lateral shifting of said tool therein, means engageable with said tool and movable relative to said carrier member to move said tool longitudinally in said pass, said tool shifting laterally in said pass during said longitudinal movement.

8. In a device of the class described, the combination of a carrier member having a curvilinear tool pass extending from one of its ends to a side wall thereof, a tool bendable between its ends and capable of bodily movement longitudinally in said pass, a sampling head carried at the outer end of said tool, said pass being widened at its inner end to permit lateral shifting of said tool therein, and means engageable with said tool and movable relative to said carrier member to move said tool longitudinally through said pass, said tool shifting laterally in said pass during said longitudinal movement.

9. In a device of the class described, the combination of a carrier member having a pass, a curved tool bendable between its ends and capable of bodily movement longitudinally in said pass, a sampling head carried at the outer end of said tool, said pass being widened at its inner end to permit lateral shifting of said tool therein, and means engageable with said tool and movable relative to said carrier member to move said tool longitudinally in said pass, said tool shifting laterally in said pass during said longitudinal movement.

10. In a device of the class described, the combination of a carrier member having a pass, a curved tool having a joint between its ends and capable of bodily movement longitudinally in said pass, a sampling head carried at the outer end

of said tool, said pass being widened at its inner end to permit lateral shifting of said tool therein, and means engageable with said tool and movable relative to said carrier member to move said tool longitudinally in said pass, said tool shifting laterally in said pass during said longitudinal movement.

11. In a device of the class described, the combination of a carrier member having a pass, a curved tool capable of bodily movement longitudinally in said pass, a sampling head carried at the outer end of said tool, said pass being widened at its inner end to permit lateral shifting of said tool therein, means engageable with said tool and movable relative to said carrier member to move said tool longitudinally in said pass, and means included in said engageable means to permit lateral shifting of said tool with respect thereto and in said pass.

12. In a device of the class described, the combination of a carrier member having a curvilinear pass, a tool bendable between its ends and capable of bodily movement longitudinally in said pass, a sampling head carried at the outer end of said tool, means engageable with said tool and movable relative to said carrier member to move the tool through said pass, said tool engaging means and said pass permitting said tool to shift laterally in said pass during its movement.

13. In a device of the class described, the combination of a carrier member having a pass, a curved tool bendable between its ends and capable of bodily movement longitudinally in said pass, a sampling head carried at the outer end of said tool, means engageable with said tool and movable relative to said carrier member to move the tool through said pass, said tool engaging means and said pass permitting said tool to shift laterally in said pass during its movement.

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