March 19, 1929. A. J. MASON, JR 1,705,623

EARTH SAMPLER

Filed Jan. 26, 1927 2 Sheets-Sheet 1

Fig. 1.

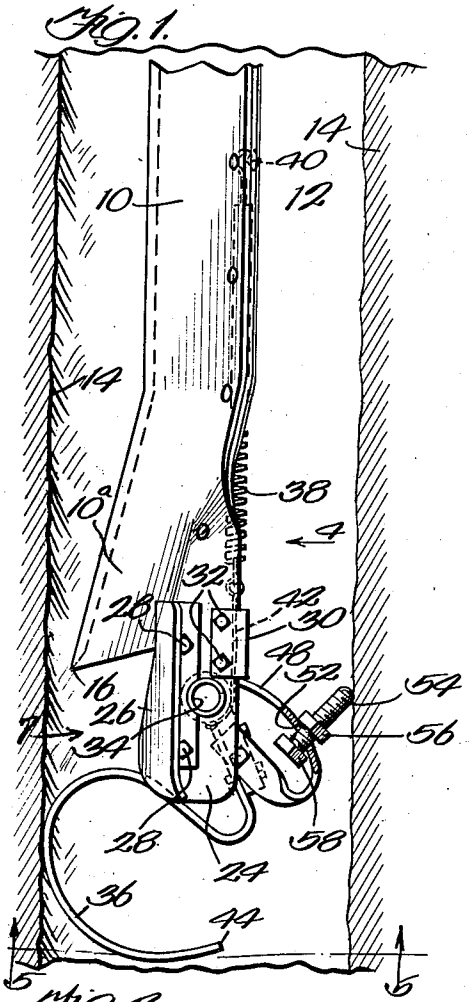


Fig. 2.

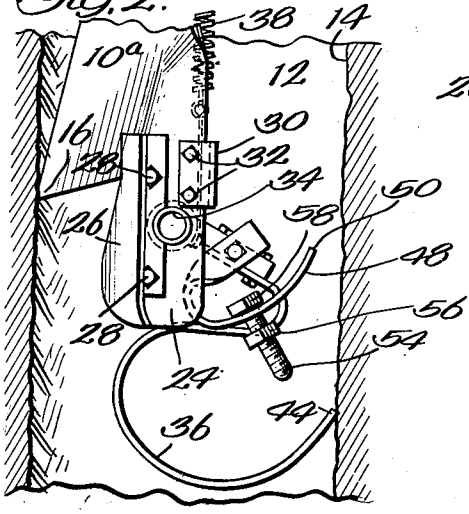
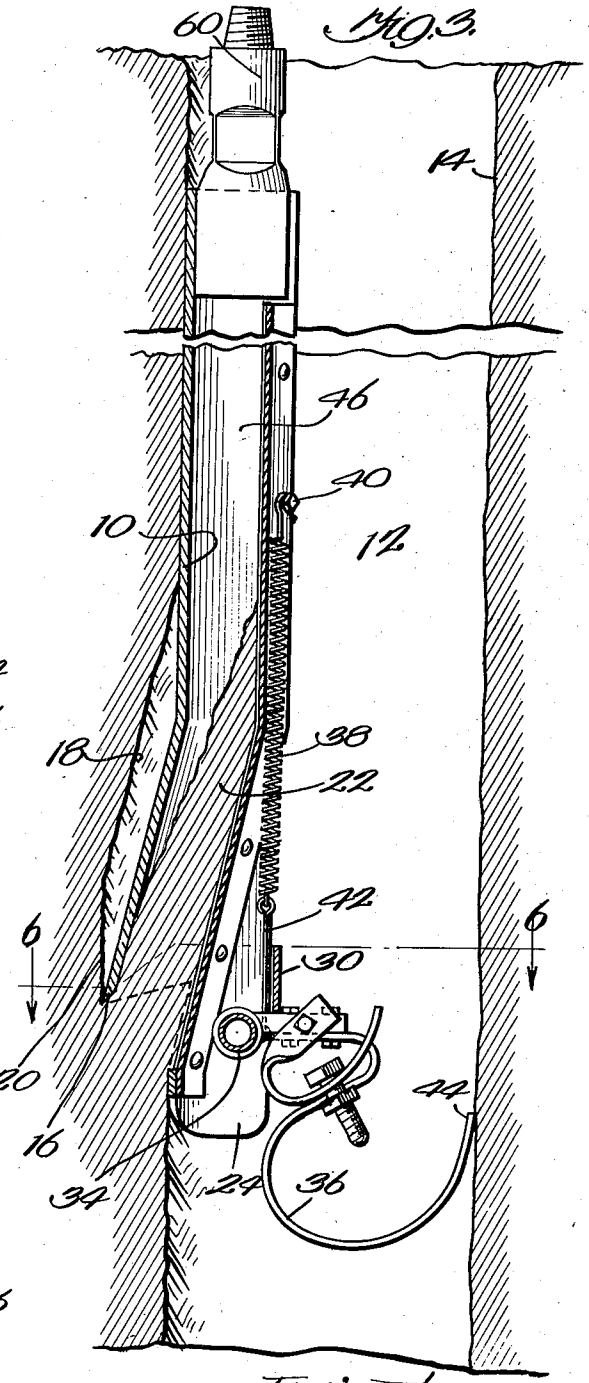


Fig. 3.



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Fig. 4.

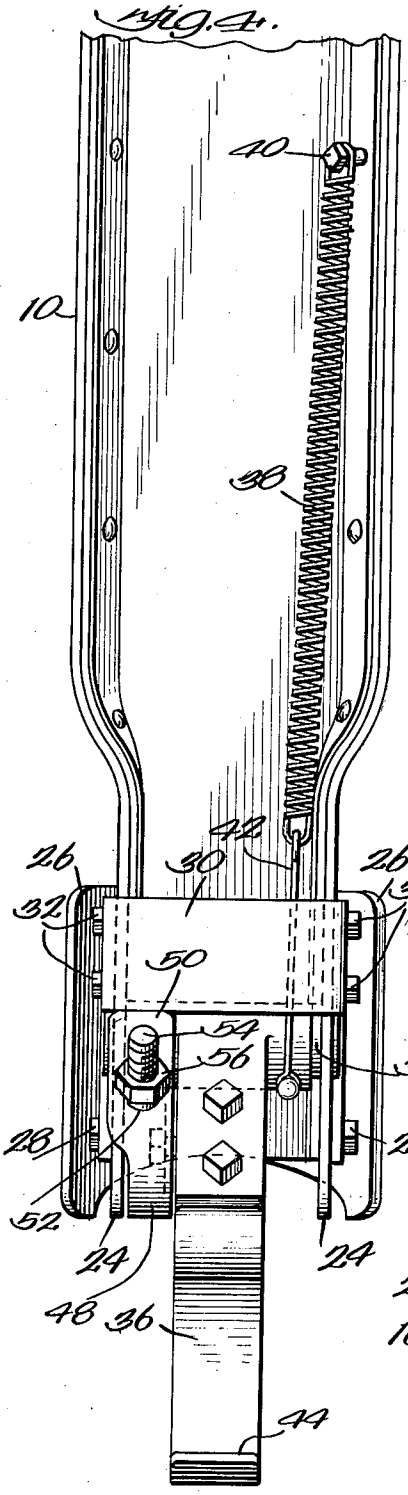


Fig. 5.

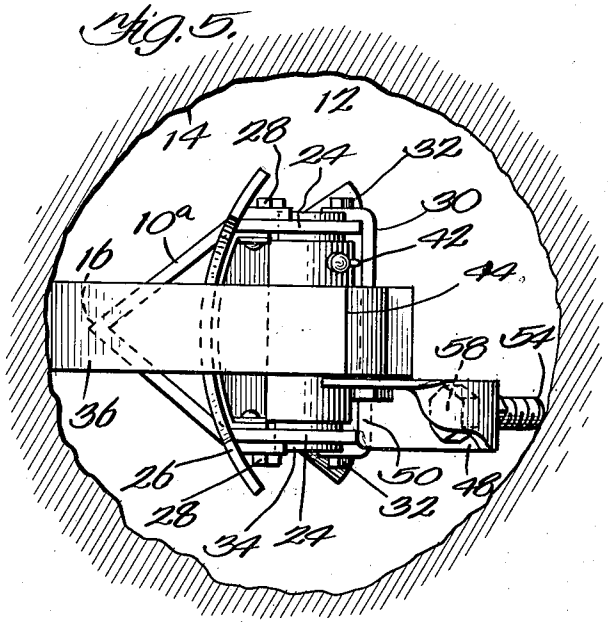


Fig. 6.

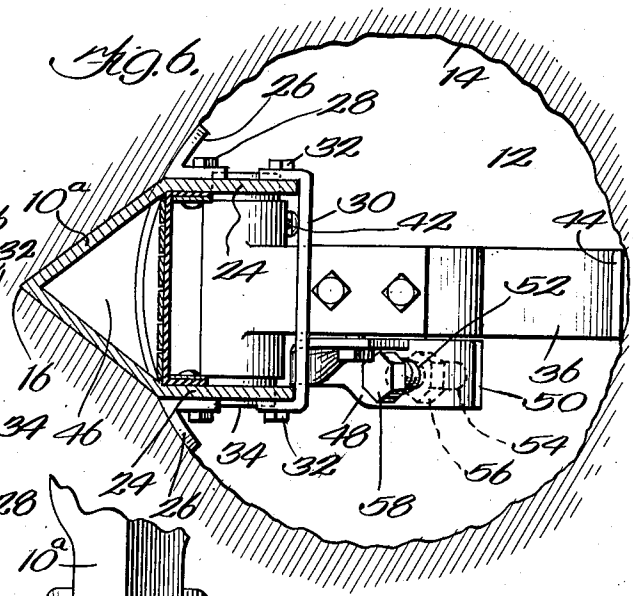
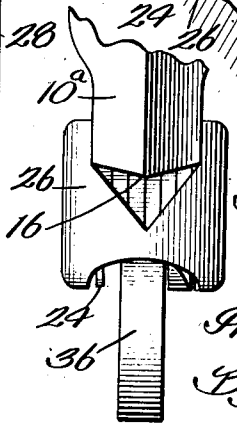


Fig. 7.



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Patented Mar. 19, 1929. 1,705,623

UNITED STATES PATENT OFFICE.

ARTHUR J. MASON, JR., OF TAFT, CALIFORNIA.

EARTH SAMPLER.

Application filed January 26, 1927. Serial No. 163,618.

This invention relates to apparatus for securing samples of material forming the walls of a tubular hole manually made in the earth, as by drilling for oil, minerals and the like, and more particularly to devices capable of cutting one or more samples of wall material from the side of a perforation in the earth at any predetermined point along the depth of such perforation, one form of such a mechanism being shown in my earlier application, Serial Number 34,757, filed June 4, 1925, and a modification thereof in my Patent No. 1,599,140 issued September 7, 1926.

Objects of the invention are to provide means preventing the sample cutting device from engaging the wall of the earth perforation prior to the time the operator wishes the sample taken; also to provide novel and positive means for forcing the sampling apparatus into engagement with the tubular hole wall from which a sample is to be taken at the predetermined point, said two means being preferably but not necessarily one mechanical part in two different positions.

The invention consists in means capable of attaining the foregoing and other objects; which can be easily and cheaply made; which is satisfactory in use and is not readily liable to get out of order.

More particularly the invention consists in numerous features and details of construction which will be hereafter more fully set forth in the specification and claims.

Referring to the drawings in which like numerals represent the same parts throughout the several views:

Figure 1 is a side elevation, illustrating this invention in its preferred form in the position which the parts assume in descending the earth perforation before the operator has decided to take a sample.

Figure 2 is a changed position view of the essential mechanism of Figure 1 just at the start of the operation of taking a sample.

Figure 3 is a second changed position view showing the device in the full operation of gathering a sample from the earth wall.

Figure 4 is a side view taken from the right of Figure 1 as indicated by the arrow 4 on that figure.

Figure 5 is a bottom view on the line 5—5 of Figure 1.

Figure 6 is a plan view on the irregular line 6—6 of Figure 3.

Figure 7 is a reduced size view taken from the left hand side of Figure 1 at the point indicated by the arrow 7.

The earth sampler of said prior application and said patent comprises a downwardly extending preferably, but not necessarily, triangular tubular member 10, several feet in length, substantially smaller than the perforation 12 in the earth 14 from whose side wall a sample of material is at the proper point to be cut by the knife edge 16 on the lower end of the laterally extending tubular portion or member 10^a forming the lower end of tube 10. As fully set forth in said prior application and patent, the tubular case 10 descends freely in earth perforation 12 until a predetermined point therein is reached in which the knife edge 16 is mechanically forced into engagement with the earth wall 14, whereupon under the simultaneous action of said mechanism forcing the knife edge 16 into the earth wall and hammer blows or the like on the upper end of tubular case member 10, the knife 16 travels first an inclined line 18 and finally a straight vertical line 20, parallel to the central axis of earth perforation 12, with the result that an earth sample 22 is cut from the wall of the perforation and forced into the tubular case 10 with which said sample is ultimately removed from the earth perforation 12.

In neither one of my two heretofore mentioned prior devices was means provided for definitely holding knife edge 16 away from the adjacent earth wall 14 as the tubular sampler member 10 descends in the earth perforation 12. The present invention includes highly desirable means for definitely accomplishing this result and also an improved means for forcing the cutting edge 16 into operative relation with the earth wall, as shown in Figures 2 and 3.

The improved mechanism carrying out this invention is preferably but not necessarily mounted upon and between two depending ears or walls 24 carried by and, in the particular case here illustrated, integral with the tubular member 10. These ears are reinforced by triangular guide plates 26 secured in place by any suitable means as for instance bolts or screws 28. These guide plates 26, as clearly shown in Figure 6 serve to hold the entire mechanism in proper relation with the curved wall 14 of the earth perforation 12. The two ears

24 are connected together and braced apart by horizontally disposed stop cross bar 30 detachably secured in place by any suitable means as, for instance, the bolts 32. Piercing these ears 24 is a transverse pin or shaft 34 pivotally sustaining the Z-shaped toggle 36, capable of moving between the positions of Figures 1 and 3. This toggle 36 is urged to rotate about pivot 34 in a counter-clockwise direction by means of a retractile spring 38 attached at its upper end to a fixed bolt 40 or the like on the side wall of tubular member 10, and attached at its lower end by any suitable flexible, connecting member 42 to the toggle 36 at a point immediately adjacent to the pivot connection 34. The result of the construction heretofore described is that in the absence of parts hereafter mentioned, the spring 38 draws the toggle 36 to the position shown in Figure 3 wherein free swinging toggle end 44 engages the side of earth wall 14 opposite to the point where earth sample 22 is to be cut. As the spring urged toggle pushes cutting knife 16 into its adjacent earth wall and as the sampler simultaneously descends the earth perforation, an earth sample 22 is cut and it moves into the interior 46 of the sampler, as fully described in said prior application and said prior patent.

In order to hold toggle 36 in the position of Figure 1, wherein it is possible to lower the tubular sampler 10 down the earth perforation 12 to the point where a sample is to be taken, and wherein said toggle 36 engages the portion of earth wall 14 which is immediately adjacent to knife 16 to thereby hold the knife away from and clear of said wall as clearly shown in Figure 1, the toggle 36 is provided at a suitable point along its length with a rotatable latch 48 whose end 50 in locked position engages stop 30 as clearly shown in Figure 1.

This latch 48 has a U-shaped flat part provided at a suitable point in its length with an elongated slot 52 within which loosely fits a bolt 54 detachably and adjustably secured in place by a thread nut 56 suitably located on the bolt intermediate of its ends, said nut 56 and the head 58 of bolt 54 being on opposite sides of the material of latch 48. This slot 52 is so located that when the bolt 54 is in place, when the latch 48 is in locked position as shown in Figure 1, said bolt 54 then bears loosely against the adjacent earth wall 14 and as the sampler 10 descends the earth perforation 12, said bolt 54 travels freely and loosely along the earth wall. When, however, the sampler has reached a position in the earth perforation 12 where the operator desires to manipulate the device so as to take a sample, he merely pulls the entire earth sampler 10 upward a short distance using for the purpose mechanism not shown, attached to the sampler at 60, thereby causing bolt 54 to dig into adjacent earth wall 14 thus retarding upward movement of latch 48 and consequently causing it to swing out from under stop 30. The instant the latch 48 clears stop 30, the entire latch mechanism 48 and attached parts, including the bolt 54, swings downward to the position shown in Figures 2 and 3, thus permitting spring 38 simultaneously acting to draw the toggle 36 first to the position of Figure 2 and then, as the operator reverses the movement of the sampler, drive it downward to the position of Figure 3. The further downward movement of the sampler causes a continuous strip of earth sample 22 to feed up into the interior 46 of the sampler as fully set forth in said prior application and said prior patent.

It has heretofore been indicated, the toggle 36 positively keeps the cutting knife 16 away from the earth wall as the sampler descends the earth perforation 12 and, after release of the latch 48 serves to then force the cutting knife 16 into engagement with the wall which is to be sampled. The entire mechanism is much more simple and efficient and satisfactory in operation than the device of said prior application and said prior patent for driving the earth sampler into contact with the wall as the earth sampling operation takes place.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. An earth sampler adapted to traverse an earth perforation, said sampler having cutting means engageable with a side of the wall of the perforation to cut a sample therefrom, a member carried by the sampler swingable to a position in engagement with the side of said wall from which the sample is to be taken and to a position in engagement with an opposite side of the wall of said perforation to force said cutting means into engagement with the first mentioned side of said wall, means releasably holding said member in engagement with said first mentioned side of said wall thereby to hold the cutting means out of engagement with the wall of the perforation, and means for swinging said member when same is released into engagement with the second mentioned side of said wall.

2. An earth sampler adapted to traverse an earth perforation, said sampler having cutting means engageable with a side of the wall of the perforation to cut a sample therefrom, a member carried by the sampler swingable to a position in engagement with the side of said wall from which the sample is to be taken and to a position in engagement with an opposite side of the wall of said perforation to force said cutting means

into engagement with the first mentioned side of said wall, means releasably holding said member in engagement with said first mentioned side of said wall thereby to hold the cutting means out of engagement with the wall of the perforation, means for swinging said member when same is released into engagement with the second mentioned side of said wall, and means operable by engagement with the second mentioned side of the wall of said perforation to release said holding means.

3. An earth sampler adapted to traverse an earth perforation, said sampler having cutting means engageable with a side of the wall of the perforation to cut a sample therefrom, a member carried by the sampler swingable to a position in engagement with the side of said wall from which the sample is to be taken and to a position in engagement with an opposite side of the wall of said perforation to force said cutting means into engagement with the first mentioned side of said wall, means releasably holding said member in engagement with said first mentioned side of said wall thereby to hold the cutting means out of engagement with the wall of the perforation, means for swinging said member when same is released into engagement with the second mentioned side of said wall, and means operable by engagement with the second mentioned side of the wall of said perforation when the sampler is moved in a non-cutting direction to release said holding means.

4. An earth sampler adapted to traverse an earth perforation, said sampler having cutting means engageable with a side of the wall of the perforation to cut a sample therefrom, a member carried by the sampler swingable to a position in engagement with the side of said wall from which the sample is to be taken and to a position in engagement with an opposite side of the wall of said perforation to force said cutting means into engagement with the first mentioned side of said wall, means releasably holding said member in engagement with said first mentioned side of said wall thereby to hold the cutting means out of engagement with the wall of the perforation, means for swinging said member when same is released into engagement with the second mentioned side of said wall, and means operable by engagement with the second mentioned side of the wall of said perforation solely when the sampler is moved in a non-cutting direction to release said holding means.

5. An earth sampler adapted to traverse an earth perforation, said sampler having cutting means engageable with a side of the wall of the perforation to cut a sample therefrom, a member carried by the sampler swingable to a position in engagement with the side of said wall from which the sample is to be taken and to a position in engagement with an opposite side of the wall of said perforation to force said cutting means into engagement with the first mentioned side of said wall, a latch carried by said member engageable with a portion of the sampler to releasably hold said member out of engagement with said second mentioned side of the wall of the perforation, and means for swinging said member when said latch is released into engagement with the said second mentioned side of said wall.

6. An earth sampler adapted to traverse an earth perforation, said sampler having cutting means engageable with a side of the wall of the perforation to cut a sample therefrom, a member carried by the sampler swingable to a position in engagement with the side of said wall from which the sample is to be taken and to a position in engagement with an opposite side of the wall of said perforation to force said cutting means into engagement with the first mentioned side of said wall, a latch to hold said member in engagement with said first mentioned side of said wall thereby to hold the cutting means out of engagement with the wall of the perforation, means carried by said latch engageable with the wall of the perforation to release said latch, and means for swinging said member, when said latch is released, into engagement with the second mentioned side of the wall of said perforation.

7. An earth sampler adapted to traverse an earth perforation, said sampler including cutting means engageable with a side wall of the perforation to cut a sample therefrom, and a guard device carried by said sampler for engagement with the side wall of said perforation to hold said cutting means spaced from said side wall, said guard device being movable to a position to permit said cutting means to engage said side wall to cut a sample therefrom.

8. An earth sampler adapted to traverse an earth perforation, said sampler including cutting means effective upon movement of the sampler into said perforation to cut a sample from the side wall thereof, releasable means for holding said cutting means out of engagement with the wall of said perforation, and means whereby movement of said sampler outwardly of said perforation releases said holding means so that the sampler may, upon subsequent inward movement thereof, cut a sample from the side wall of the perforation.

9. An earth sampler adapted to traverse an earth perforation, said sampler including cutting means engageable with the side wall of said perforation to cut a sample therefrom, and a single member carried by said sampler movable to two different positions, in one of which it prevents engagement of said cutting means with the side wall of

the perforation and in the other of which it reacts from said side wall at one point to force said cutting means into engagement with said side wall at another point.

10. An earth sampler adapted to traverse an earth perforation, said sampler including cutting means engageable with the side wall of said perforation to cut a sample therefrom, a single member carried by said sampler movable to two different positions, in one of which it prevents engagement of said cutting means with the side wall of the perforation and in the other of which it reacts from said side wall at one point to force said cutting means into engagement with said side wall at another point, releasable means for holding said member in the first of said two positions, and yieldable means constantly urging said member to the second of said two positions.

11. An earth sampler adapted to traverse an earth perforation, said sampler including cutting means engageable with the side wall of the perforation to cut a sample therefrom, and a single member carried by said sampler operable both to hold said cutting means out of engagement with said side wall and to force said cutting means into engagement with said side wall.

12. An earth sampler adapted to traverse an earth perforation, said sampler including cutting means engageable with the side wall of the perforation to cut a sample therefrom, a member carried by said sampler engageable with one side of the wall of said perforation to hold said cutting means out of engagement therewith and engageable with an opposite side of the wall of said perforation to force said cutting means into cutting engagement with the first mentioned side of said wall, a spring constantly urging said member into engagement with the second mentioned side of said wall, a latch to hold said member in a position to hold said cutting means out of engagement with the first mentioned side of said wall, and means whereby movement of sampler along the perforation releases said latch.

In witness whereof, I have hereunto subscribed my name.

ARTHUR J. MASON, JR.