Aug. 27, 1935. B. B. TALBOT ET AL 2,012,836

SAMPLING DEVICE

Filed Feb. 9, 1933

Fig. 1.

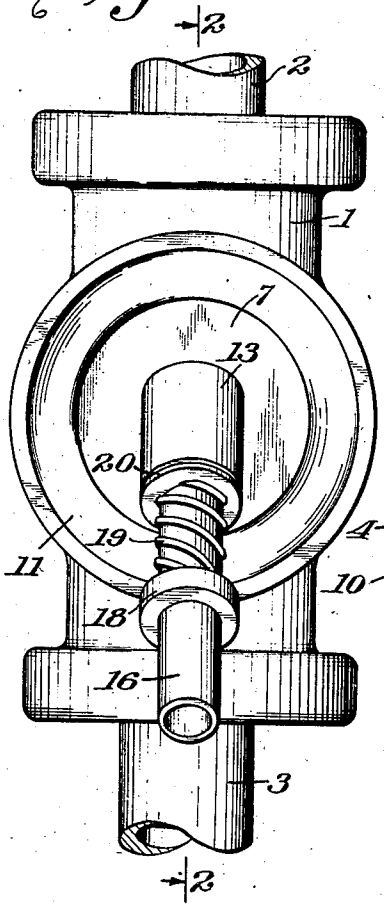



Fig. 2.

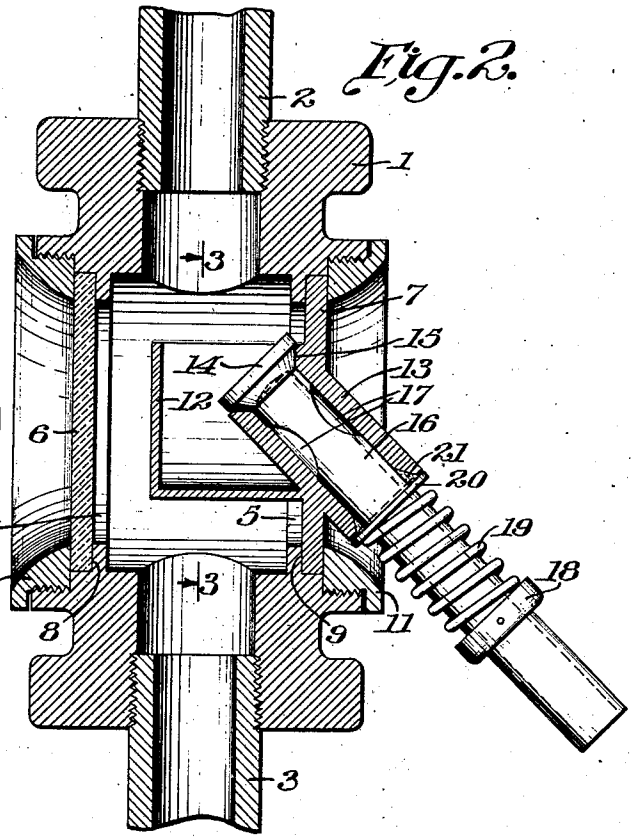
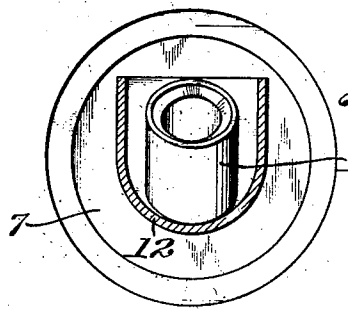



Fig. 3.

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2,012,836

## SAMPLING DEVICE

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7 Claims. (Cl. 73—21)

This invention concerns a device for taking samples from a stream of fluid material as it is moved thru a pipe line.

In a specific application thereof the invention comprises a device which is especially suited for sampling the wax free oil stream produced by dewaxing petroleum oil according to the well-known centrifuge process to determine the wax content of the stream.

It is an object of the invention to provide a device of the character described which is simple and inexpensive to construct and which affords a convenient and effective means for taking the desired samples.

In centrifuge dewaxing of petroleum it is customary to chill the wax-containing oil to precipitate the wax and thereafter to separate the wax from the oil by centrifuging. The oil and the wax are discharged from the centrifuge machine in separate streams and it has been the practice heretofore to employ look boxes in the wax free oil discharge line for determining by inspection the condition of the oil stream, particularly with respect to its wax content.

Look boxes of this type comprise essentially a housing forming an enlarged portion in the line and a pair of sight glasses in the housing for viewing the stream of oil as it is moved thru the line. In contact with the cold oil such devices, including the sight glasses, become frosted and coated with ice and moreover the distance between the sight glasses also tends to obscure the view thru the glasses. It is impossible, therefore in devices of this sort to determine the condition of the oil stream without removing one of the sight glasses and taking a sample of the oil. This practice results in considerable breakage of the sight glasses and is a rather inconvenient and generally unsatisfactory procedure.

By the use of our invention we are enabled to quickly and simply secure samples of any desired size of the oil or other liquid passing through the pipe, and careful observation of the character of each sample may immediately be made.

The invention will be better understood from a consideration of the following description and the accompanying drawing forming a part thereof.

Referring to the drawing:

Fig. 1 is a view in elevation of a sampling device constructed in accordance with the invention.

Fig. 2 is a sectional view taken on the line of 2—2 of Fig. 1.

Fig. 3 is a sectional view showing a portion of the device taken on the line 3—3 of Fig. 2.

In the particular arrangement shown an ordinary look box has been adapted for use as a sampling device by removing one of the sight glasses and securing in its place a valve mechanism which will be hereinafter more fully described. As shown in Fig. 2 of the drawing, the device comprises a housing 1 connecting an inlet pipe 2 and an outlet pipe 3, the housing forming an enlarged portion in the passage thru said pipe. The housing 1 is provided with a pair of opposed circular openings 4 and 5. In the modified look box shown, one of the sight glasses has been removed and a valve mechanism having a disc portion or plate member 7 is secured in the opening 5 in place of the sight glass which has been removed. The openings 4 and 5 are provided with grooves 8 and 9, adapted to receive the sight glass 6 and the disc portion 7 respectively which are secured in position by means of threaded rings 10 and 11 adapted to be secured in said openings.

The valve mechanism referred to includes a cup-shaped member 12 which preferably is formed integral with the disc portion 7 although it may be integral with the housing 1 and is positioned in vertical alignment with the inlet pipe 2 so as to receive a stream of liquid passing thru the housing 1, and a valved nozzle or conduit 13 also integral with the disc portion 7 and projecting outwardly therefrom for withdrawing a portion of the liquid collected in the cup-shaped member 12.

The arrangement is such that the incoming liquid will overflow the cup 12 and be discharged thru the outlet pipe 3. Sufficient space is provided between the exterior of the cup 12 and the walls of the housing, so that the presence of the cup does not restrict the flow of liquid thru the housing.

The cup 12 is preferably of such depth that additional increments of liquid dropping into the cup are effective in forcing out of the cup portions of the liquid contained therein so that the body of liquid remaining in the cup is at all times representative of the stream passing thru the housing 1. The depth of the cup is preferably sufficient to prevent excessive splashing and at the same time a substantial amount of liquid may be retained therein, a part of which may be withdrawn thru the valved nozzle 13.

The sides of the cup 12 are preferably curved at the bottom as shown in Fig. 3 so that there are no corners for the accumulation of stagnant

portions of liquid or ice or sediment which might tend to foul the sample as well as to make cleaning of the device necessary. In the arrangement shown, the liquid contained in the cup may be continuously forced out by the flow of incoming liquid.

The interior wall of the housing 1, preferably is of such shape as to facilitate the draining of liquid from the housing and to avoid the accumulation of liquid or ice or sediment therein. As shown, the interior wall of the housing is circular in shape and adapted to be washed clean by the stream of liquid passing thru the housing.

The nozzle 13 preferably projects downwardly from the disc portion 7 at an angle of about 45° and has an opening into the cup 12 at a point just below the top rim thereof. The nozzle is adapted to be closed by means of a valve 14 having a tapered seat 15 in the nozzle. The valve 14 is secured to a hollow stem 16 which slides in the nozzle 13 to seat and unseat the valve 14. Openings or ports 17 which may be oppositely disposed are provided in the hollow stem 16 at a point near the valve 14 so that liquid withdrawn from the cup 12 may be conducted thru the hollow stem.

A collar 18 may be secured to the projecting end of the hollow stem 16 and a spring 19 may be arranged to cooperate with the collar and with a washer 20 to force the stem downward so as to keep the valve 14 in a normally seated position. A packing ring 21 may be provided to prevent leakage between the nozzle 13 and the hollow stem 16.

The nozzle 13 and the associated hollow stem 16 project downwardly in a straight line so that the flow of liquid thru the nozzle and the stem is free and unobstructed. Accordingly the portion of liquid admitted thru the valve 14 may be completely drained and the accumulation of liquid or ice or sediment in the nozzle 13 and the stem 16 thereby avoided.

In taking a sample by use of the sampling device described a sampling bottle or other receptacle may be positioned at the outer end of the hollow stem 16 so as to receive the liquid material discharged therefrom and the stem 16 which is slidable in the nozzle 13 may be pushed upward and inward against the resistance of the spring 19 to unseat the valve 14 and allow a portion of the liquid collected in the cup 12 to be withdrawn.

It will be apparent that should the supply of liquid to the sampling device be cut off by reason of plugging of the associated apparatus or for other cause the level of the liquid in the cup 12 will be lowered as a portion of it is withdrawn thru the nozzle 13 until liquid will cease to flow thru the nozzle when the valve 14 is unseated and it may thus be determined that there is no stream of liquid moving thru the device.

It is contemplated that in the particular application of the device where it is used for sampling cold oil, the device may be operated for long periods of time before the cup 12 becomes choked up with ice to such extent that cleaning is necessary. The action of the stem 16 in unseating the valve 14 is such that any ice collecting in the upper portion of the cup 12 may be broken away by thrusting the valve 14 thru the ice.

One form of the invention has been described comprising a modification of an ordinary look box in which one of the sight glasses has been removed by simply unscrewing the threaded ring 11 and in which the sight glass has been replaced by the valve mechanism shown, the valve mechanism having the disc portion 7 adapted to be inserted in the groove 9 and clamped therein by the threaded ring 11.

Obviously many modifications and variations of the invention, as herein set forth, may be made without departing from the spirit and scope thereof, and therefore, only such limitations should be imposed as are indicated in the appended claims.

We claim:

1. A device for sampling a stream of liquid moving through a pipe line comprising a housing interposed in the pipe line, an open cup fixedly positioned within the housing with the plane of its opening substantially at right angles to, and directed against, the line of liquid flow and adapted to hold a continuously changing sample of liquid, a conduit communicating with the cup and projecting through the wall of the housing for periodically gravitating liquid from the cup and a valve mechanism for controlling the gravitation of liquid therefrom.

2. A device for sampling a stream of liquid moving through a pipe line comprising a housing interposed in the pipe line, an open cup fixedly positioned within the housing with the plane of its opening substantially at right angles to, and directed against, the line of liquid flow and adapted to hold a continuously changing sample of liquid, a conduit communicating with the cup and projecting through the wall of the housing for gravitating liquid from the cup, a valve in the end of the conduit adjacent the cup for controlling the gravitation of liquid and a hollow cylindrical valve stem slidably positioned within the conduit for actuating the valve from without.

3. A device for sampling a stream of liquid moving through a pipe line comprising a housing interposed in the pipe line, an open cup fixedly positioned within the housing with the plane of its opening substantially at right angles to, and directed against, the line of liquid flow and adapted to hold a continuously changing sample of liquid, a conduit communicating with the cup and projecting through the wall of the housing for periodically gravitating liquid from the cup, a valve in the end of the conduit adjacent the cup for controlling the gravitation of liquid, a hollow cylindrical valve stem slidably positioned within the conduit, and spring means cooperating therewith for maintaining the valve normally in a closed position.

4. A device for sampling a stream of liquid moving through a pipe line comprising a housing interposed in the pipe line, an open cup fixedly positioned within the housing with the plane of its opening substantially at right angles to, and directed against, the line of liquid flow and adapted to hold a continuously changing sample of liquid, a conduit communicating with the cup and projecting through the wall of the housing for gravitating liquid from the cup, a valve in the end of the conduit adjacent the cup for controlling the gravitation of liquid, a hollow cylindrical valve stem having inlet ports adjacent to the inner end thereof slidably positioned within the conduit, and spring means cooperating therewith for maintaining the valve normally in a closed position.

5. A device for sampling a stream of liquid moving through a pipe line comprising a housing interposed in the pipe line, said housing having an opening therein, a plate adapted to close said opening, an open cup integral with the plate and adapted to be positioned within the

housing with the plane of its opening substantially at right angles to, and directed against, the line of liquid flow and to receive a representative sample of liquid, a conduit communicating with the cup and projecting through the plate for gravitating liquid from the cup and a valve mechanism for controlling the gravitation of liquid therefrom.

6. A device for sampling a stream of liquid moving through a pipe line comprising a housing interposed in the pipe line, said housing having an opening therein, a plate adapted to close said opening, an open cup integral with the plate and adapted to be positioned within the housing with the plane of its opening substantially at right angles to, and directed against, the line of liquid flow and adapted to receive a representative sample of liquid, a conduit communicating with the cup and projecting through the plate for gravitating liquid from the cup and a valve in the end of the conduit adjacent the cup for controlling the gravitation of liquid, a hollow cylindrical valve stem slidably mounted within the conduit and having inlet ports adjacent to the inner end thereof, and spring means cooperating with the valve stem for maintaining the valve normally in a closed position.

7. The combination with a look box containing one or more transparent windows for observing the flow of fluid through the look box, of a device for sampling the stream of fluid passing through the look box comprising a plate-like member adapted to replace one of the transparent members in the look box, an open cup positioned within the look box with the plane of its opening substantially at right angles to, and directed against, the line of fluid flow and adapted to receive a representative sample of fluid, a conduit communicating with the cup and projecting through the plate-like member for gravitating fluid from the cup and a valve mechanism for controlling the gravitation of fluid comprising a valve in the end of the conduit adjacent to the cup, a hollow cylindrical valve stem having inlet ports adjacent to the inner end thereof, said valve stem being slidably positioned within the conduit and spring means cooperating therewith for maintaining the valve normally in a closed position.

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