

Feb. 4, 1930.

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1,745,804

FLEXIBLE MECHANICAL PICK

Filed March 30, 1926

2 Sheets-Sheet 1

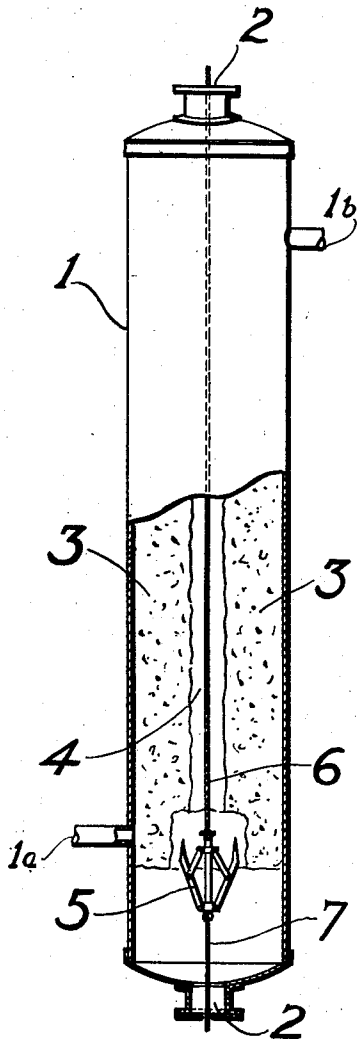


FIG. -1

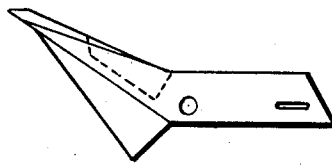


FIG. -4

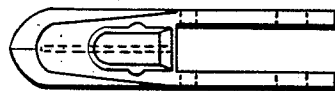


FIG. -5

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2 Sheets-Sheet 2

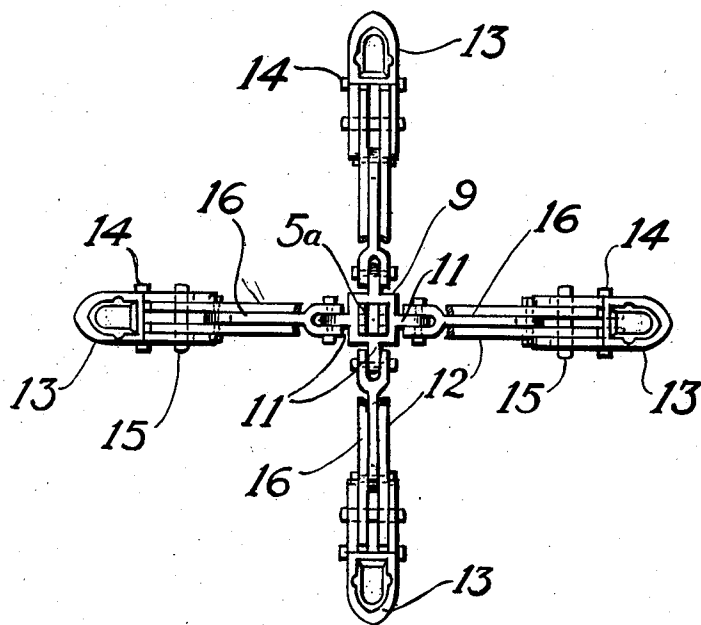
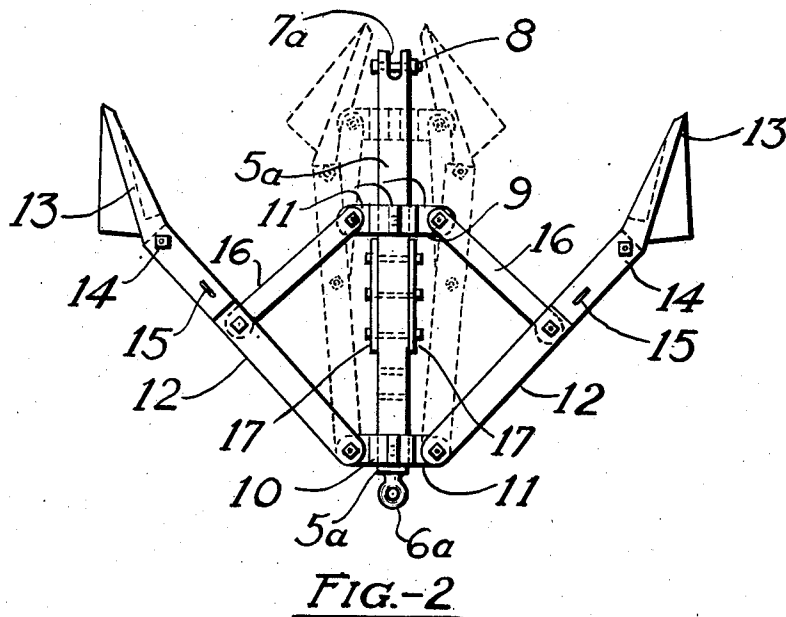


FIG. - 3

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## UNITED STATES PATENT OFFICE

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## FLEXIBLE MECHANICAL PICK

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The present invention relates to means for removing hard, brittle, incrustated material from the inside of containers in which it has been deposited, and specifically to means for removing the coky mass which has been deposited within soaking or digesting drums and settling chambers used in the pyrolysis of hydrocarbon oils. The invention will be fully understood from the following description, taken together with the attached drawings, which show diagrammatically the preferred form of apparatus contemplated herein. Fig. 1 is a vertical sectional view of the soaking drum taken on its axis and showing the pick in operative position. Fig. 2 is a vertical elevation of the pick, with the front arm removed. Fig. 3 is a plan view of the pick with the arms extended. Figs. 4 and 5 are respectively side and plan views of the pick point.

Referring specifically to Fig. 1, the soaking drum 1 is shown in section, as a vertical, right circular cylinder, whose length is great compared to the diameter, and provided at the upper and lower ends with manholes 2 which can be covered by heads (not shown) when the drum is in use. The drum has an inlet 1<sup>a</sup> and an outlet 1<sup>b</sup> for the oil which passes through the drum in the course of its cracking treatment. The hard coky mass 3, which has been deposited during the cracking of the oil, is shown cleared from the lower section of the drum and has a hole 4 drilled through the entire layer of the coke, as hereinafter described. The pick 5, shown in the cutting position, has cables 6 and 7 fastened to its upper and lower ends and by means of the cables may be pulled up with sudden intermittent impulses against the coky mass to be removed. These impulses are transmitted to the pick from any well-known mechanism, such as a winch, capstan, or engine (not shown). The coke, dislodged by the sudden impulses of the pick, is allowed to fall through the lower manhole 2.

In Figs. 2 and 3 there is shown a central shaft 5<sup>a</sup> of a uniform, square cross-section having an eye 6<sup>a</sup> at its lower end and a slot 7<sup>a</sup> in which a pin 8 is fitted at the upper end. Cables may be attached to the eye 6<sup>a</sup> and the

pin 8. The upper movable, and the lower stationary webs 9 and 10 respectively are provided with square central holes through which the shaft 5<sup>a</sup> is passed, and lugs 11 are formed integral with each of the two webs 9 and 10. Two metallic pick-carrying arms 12 are pivoted by pins to each of the four lugs 11 of web 10 as shown; to the upper ends of these arms 12 are fastened rigidly the pick points 13 by bolts 14 and the adjustable keys 15.

Supports 16 are pivotally secured at one end to the lugs 11 of the movable web 9, and the other ends are pivoted to the arms 12 at about the middle points. Stops 17 are bolted rigidly to the shaft 5<sup>a</sup> between upper and lower webs 9 and 10, limiting the movement of the web 9 in the direction of the web 10. Several holes are provided in shaft 5<sup>a</sup> so that the position of the stops may be changed.

The stationary web 10 is welded to the shaft 5<sup>a</sup> so that it cannot slip off from the lower end of the shaft. It will be seen that the apparatus described is analogous to an inverted umbrella frame. By raising the upper movable web 9, the pick points and arms assume the folded position as shown by the dotted lines in Fig. 2. In this position the device can be readily passed through a hole of much smaller diameter than would be possible if the arms were extended.

The device above described may be used as an aid in cleaning a soaking drum as follows: After the run is completed and the flow of oil and vapors into the drum has ceased, the said drum is allowed to cool until the upper and lower manheads can be removed. Steam is then admitted to further cool and remove any hydrocarbon vapors from the solid coky mass which has been deposited in the drum. Before the beginning of the run a heavy chain has been suspended from clips on the inside of the drum and extending from side to side crosswise and upwardly for perhaps 5 feet, more or less, with the end of said chain left conveniently near the lower manhole. This heavy chain is now pulled out by any suitable means, such as a winch or steam engine, and in doing so the coke in the lower section of the drum is removed as

shown in Fig. 1. The hole 4, shown in Fig. 1, is now drilled by any ordinary drilling means, either by hand or by machinery for that purpose, and a cable is lowered through the hole 4 from the top of the drum and made fast to the pin 8 in the shaft 5<sup>a</sup>. The pick is now folded and in this form can be readily drawn up through the lower manhole 2, whereupon the arms and points fall out to the extended position and the pick is then in the cutting position as shown in Fig. 1.

To use the pick the cable 6 is drawn up by any known means such as a hoist, while the cable 7 is used to keep the pick properly centered and to prevent its swinging too violently from side to side. The pick is then pulled upwardly by violent impulse, breaking and chipping off portions of the coky mass which are allowed to fall and which pass out of the drum through the lower manhole. When the pick has been passed through the entire layer of coke in the aforesaid jerky discontinuous and intermittent manner, it may be lowered through the lower manhole and the pick points readjusted to a new position by bolting the stops 17 in holes closer to the lower web than were used in the first cutting, so that a larger hole can be cut through the coke. This procedure is repeated until the coke has been substantially completely removed from the drum and until that which remains is inaccessible to the pick. Two or more adjustments of the stops to enlarge the size of the hole can be made. The remaining coke is now removed by men who are allowed to enter the drum and who may now do so with little or no danger of falls or large pieces of coke being dislodged from the mass. It has been found desirable to use two picks, such as have been described, fixed one above the other but with the arms staggered so as to cut a larger hole and prevent tracking.

Although the foregoing description is specifically directed to the cleaning of soaking drums or settling tanks which make up part of the equipment used in cracking oils, it should be understood that the pick may be used wherever a hard, brittle incrustation, like coke, is to be removed from the inside of some vessel, container or chamber, wherein the pointed ends of the device may be forcibly directed in sharp, intermittent blows, such as has been described, against the contents to be removed.

I claim:

1. Apparatus for breaking away coky materials deposited in receptacles used in the pyrolysis of oils and comprising a central shaft, a web fixed at one end of the shaft, a web slidably mounted on the central shaft, a plurality of picks supported by the webs, means for pivotally connecting the picks with the fixed web, and means adjacent the end of the central shaft remote from the

fixed web whereby the shaft may be suspended and drawn forcibly upward to cause the picks to impact with the coky materials.

2. Apparatus for breaking away coky materials deposited in receptacles used in the pyrolysis of oil and comprising a central shaft, a web fixed at one end of the shaft, a web slidably mounted on the central shaft, a plurality of picks supported by the webs, means for connecting the picks with the fixed web, adjustable stops on the shaft for limiting the approach of the slidable web to the fixed web, and means adjacent the end of the central shaft remote from the fixed web whereby the central shaft may be suspended.

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