

Oct. 5, 1937.

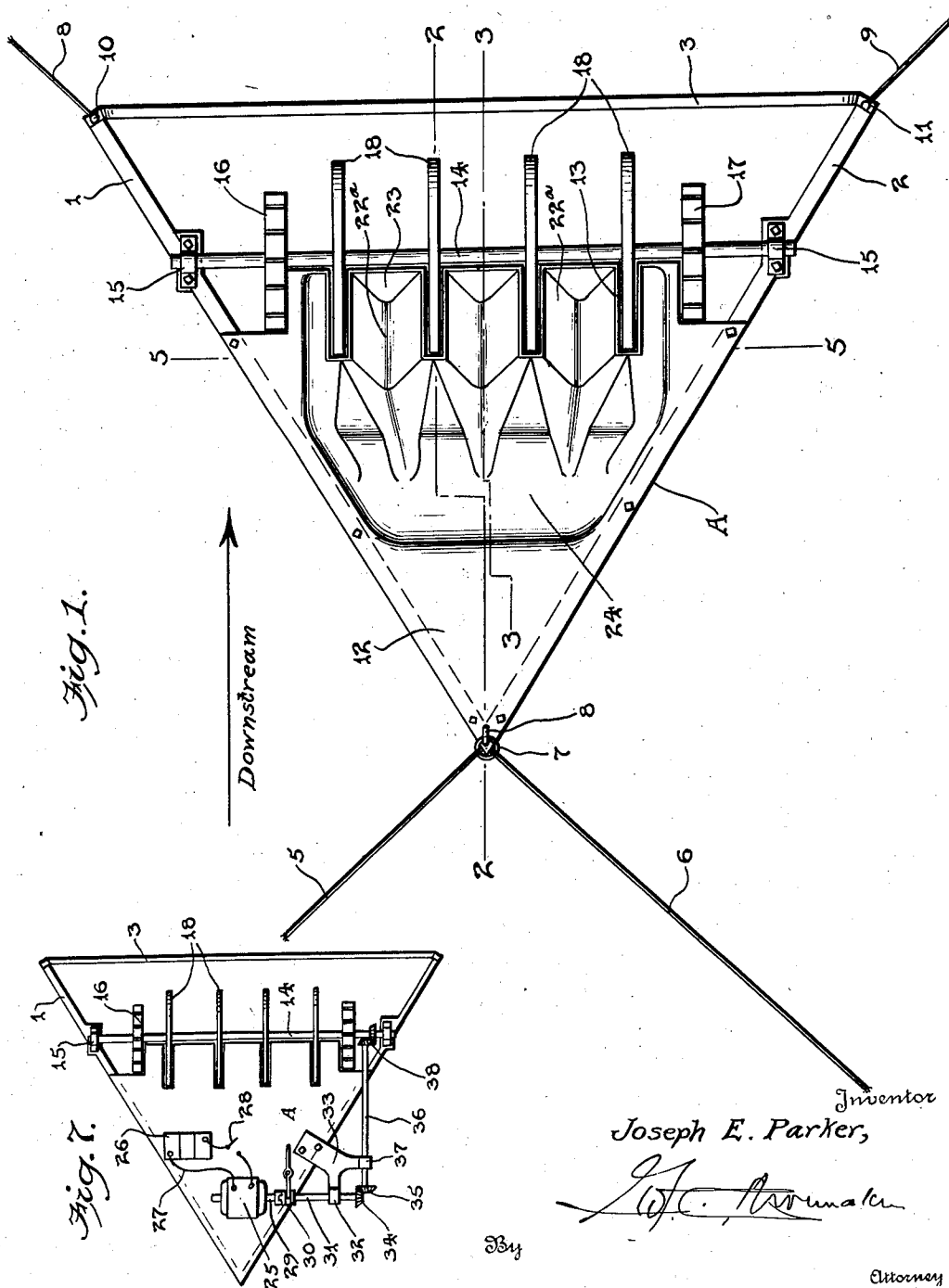
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2,094,615

APPARATUS FOR RECOVERY OF BLACK OR OTHER
MAGNETIC SANDS OR SILTS FROM STREAMS

Original Filed April 15, 1933

2 Sheets-Sheet 1



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Fig. 2.

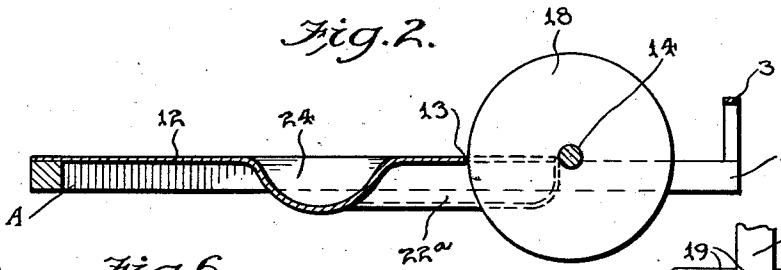


Fig. 6.

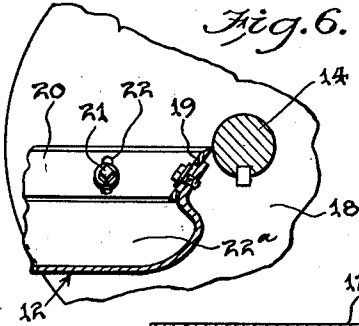


Fig. 6a.

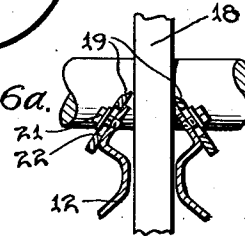


Fig. 3.

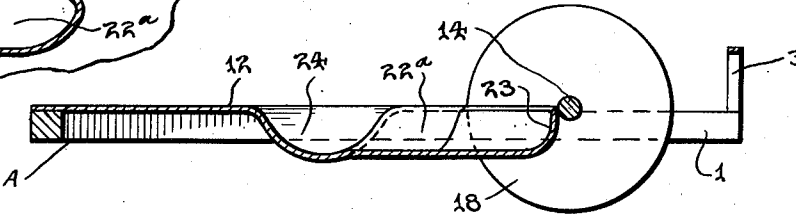


Fig. 4.

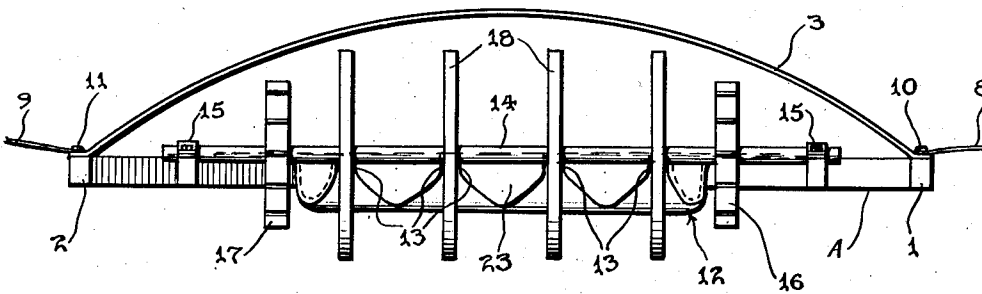
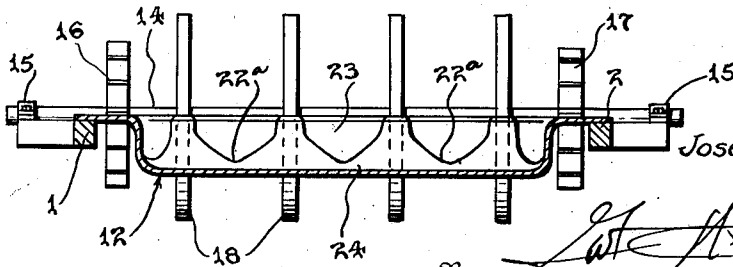


Fig. 5.



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UNITED STATES PATENT OFFICE

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APPARATUS FOR RECOVERY OF BLACK OR
OTHER MAGNETIC SANDS OR SILTS FROM
STREAMS

Joseph E. Parker, Houston, Tex.

Refiled for abandoned application Serial No.
666,366, April 15, 1933. This application Sep-
tember 24, 1936, Serial No. 102,428

4 Claims. (Cl. 209—215)

The invention relates to the recovery of black or other magnetic sands or silts from streams and the present application is filed to take the place of an abandoned application Serial No. 666,366, filed April 15, 1933, by me for the same subject matter as that of the present application.

One object of the present invention is to provide means whereby to magnetically attract magnetic sands or silts moving in traction on the bed of streams or flowing in suspension therein and deposit the same on said means for subsequent removal therefrom for use as may be desired.

Another object of the invention resides in the provision of an apparatus particularly adapted for use in a moving stream and operable under the influence of the flow of the current to gather magnetic sands or silts and carry them for deposit on the apparatus for subsequent removal therefrom for treatment as may be desired.

A still further object of the invention is to provide a simple, durable, economical and efficient apparatus which may be readily constructed for location in a moving stream, and embodying among other characteristics, a movable magnetized element to magnetically attract magnetic sands or silts in the stream and carry the same to a position with relation to the apparatus where they may be automatically or otherwise removed from the magnetized element during continuous rotation of the magnetized element for deposit on the apparatus for subsequent removal therefrom for further treatment or operation as may be desired.

It is still further designed to provide an apparatus of the nature stated, embodying among other characteristics, means whereby the apparatus may be located in a stream for continuous operation without the presence of an attendant and in which there is little or no danger of parts being hindered in operation incident to logs or other movable debris flowing down the stream and in which the continuous flow of magnetized sands or silts are continuously taken from the stream and deposited on the apparatus for subsequent removal therefrom for such purposes as may be desired.

With the above and other objects in view, the invention consists in the construction and novel combination and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings and pointed out in the claims hereto appended, it being understood that various changes in the form, proportion and minor details of construction, within the scope of the

claims, may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings:—

Fig. 1 is a top plan view of the invention, the scraper blades being not shown for sake of clearness.

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

Fig. 3 is a longitudinal sectional view on the line 3—3 of Fig. 1.

Fig. 4 is a rear elevation of the invention.

Fig. 5 is a transverse sectional view on the line 5—5 of Fig. 1.

Fig. 6 is an enlarged fragmentary detail view illustrating one of the blades for scraping or otherwise removing magnetically held deposits from one of the magnetized elements.

Fig. 6a is a fragmentary detail sectional view illustrating the scraper blades on opposite sides of one of the magnetized elements.

Fig. 7 is a fragmentary plan view on a reduced scale of a modification of the invention illustrating sufficient structure to render clear to one skilled in the art as to one manner of means for electrically operating the mechanism of the invention.

Referring now more particularly to the accompanying drawings there is illustrated a frame A which may be of any suitable size and which is in the nature of a float or raft adapted to float on the surface of the water of a stream. This frame A may be composed of any suitable material, such as logs, beams or the like, and takes preferably a triangular shaped formation, including diverging side bars 1 and 2 and a connecting strap 3 of metal which may be bolted at its ends to the rear ends of the side members 1 and 2 and which is preferably bowed upwardly as shown, particularly in Fig. 4, so that any debris which might find its way under the frame A will not be hindered from passing out of and beyond the frame.

The frame A is placed in a stream with its apex toward the down current so that the divergent relation of the sides 1 and 2 will tend to shed debris from the frame to pass on down stream and not interfere with any of the operating mechanism carried by the frame.

The frame A may be anchored in the stream in any suitable manner, but one way in which this may be accomplished is to secure cables or other suitable elements 5 and 6 to a ring 7 secured to the top of the frame A at the apex thereof by means of an eye bolt 8. Of course, the connec-

tion for the cables or the like 5 and 6 with the frame A may be effected at the apex end thereof in any suitable manner. Cables or the like 3 and 9 are preferably secured in any suitable manner as at 10 and 11 respectively, to the rear end of the frame A and these cables or the like 5, 6, 8, and 9 are adapted to extend to the opposite sides of the shore of the stream and secured in any suitable manner on the opposite shores of the stream or if desired secured to stakes (not shown) driven into the stream whereby to anchor the frame in the stream.

A steel or other metal plate 12 is bolted or otherwise secured to the upper surfaces of the side members 1 and 2, and as shown, this plate 12 provides a floor and does not extend to the strap 3, but terminates short thereof and is provided with a plurality of slits 13.

A rotatable shaft 14 is journaled in the frame A, being preferably journaled at its ends in substantial bearing blocks 15 bolted or otherwise secured to the side members 1 and 2. This shaft 14 is adapted to rotate freely under the influence of suitable water wheels 16 and 17 and which may be of any suitable character for rotation under the influence of the down moving current of the stream of water, the water wheels 16 and 17, of course, being removably secured to the shaft 14.

Wheels or disks 18 are rigidly secured in spaced relation to the shaft 14. These disks 18 are magnetized to provide for magnetic attraction and they are adapted to operate in the respective slits 13 in the plate 12 with the sides of the slits fitting rather closely to the sides and peripheries of the wheels or disks 18. The shaft 14 is arranged along the rear edge of the plate 12 and rather close thereto so that as the wheels or disks 18 rotate with the shaft 14 under the influence of the water wheels 16 and 17 the wheels or disks rotate into and out of the stream, below and above the frame A.

As the wheels or disks 18 rotate, they being magnetized, they attract sands of various kinds in suspension in the stream through magnetic attraction and carry the same upwardly out of the water forwardly over the plate 12 to the slits 13 and in order to separate the sands thus magnetically attracted and carried by the wheels or disks 18, I preferably mount hard steel or other blades 19 along the sides of the respective slits 13 by means of removable bolts or other fastenings 21 which operate through transverse slots 22 in the blades for adjustment purposes so as to provide for proper fitting relation between the blades and the wheels or disks on opposite sides of the latter to effectually scrape the attracted and held particles of sand or other materials from the sides of the wheels or disks, the peripheries of the wheels or disks 18 engaging the inner ends of the slots to effect separation of the attracted particles from the peripheries of the wheels or disks.

The plate 12 is provided with a plurality of depressions forming troughs 22^a between and on opposite sides of the wheels or disks 18 so that as the particles are separated or scraped from the wheels or disks 18 the same fall into the respective troughs 22^a which latter are closed at their rear ends as at 23 to prevent loss of the gathered materials and which troughs have their inner ends leading preferably to a main trough 24 in front of the magnetized wheels or disks 18 into which the gathered materials may be fed by hand or by a suitable implement or otherwise from the troughs 22^a and collected therefrom as occasion may require or demand and without

danger of loss of the gathered materials either through accidental washing out of the same or incident to waves or other actions of the stream or otherwise.

As previously stated, the frame A may be of any suitable size and if desired of such a size as to extend entirely across a stream or it may be of such dimensions as to carry but one magnetic wheel or disk and thereby be of comparatively small size as distinguished from a structure involving a plurality or gang of magnetic wheels or disks whether from two to twenty or more as the case may be or as conditions may suggest.

It will be understood that the plate 12, instead of having the troughs 22^a and 24 formed by pressing the metal may have these troughs otherwise formed, if desired.

While it has been stated above that the magnetic wheels or disks 18 attract the black or other sands in suspension in the stream, it will be understood that under certain conditions and particularly in shallow streams the frame A may be so mounted as to provide for a direct rotation of the magnetic wheels or disks 18 into the bed of the stream to collect by magnetic attraction the black or other sands from the bottom of the stream rather than collect them in suspension above the bed of the stream as previously stated. In other words, the present invention is applicable for use either on the bed of the stream to attract and carry the black or other sands by magnetic attraction up over and on to the plate 12 or to attract, collect and gather the black or other sands in suspension in the water and carry same to the plate 12. It will, therefore, be seen that the present invention is applicable in streams of various depths and it will be appreciated that the diameters of the wheels or disks 18 may be of any suitable dimensions, the same being larger in certain instances, depending upon the depth of the streams.

In other words, the diameters of the magnetic wheels or disks 18 may be said to depend upon the depth of streams or the flow in suspension of the silt or sands.

It will be understood that the magnetic wheels or disks 18 are produced in various sizes at the outset not only because of streams of different depths but because of frequent rise and falls of tides and it is contemplated to interchange wheels or disks 18 of various sizes according to the rise and fall of tides as well as regards the matter of the ordinary different depths of streams.

Under certain conditions it is contemplated to drive the shaft 14 by motive power other than the water wheels illustrated and this motive power may consist of an electric or other motor 25 which may be mounted on the frame A and coupled up in any suitable or common manner with one end of the shaft 14 so that especially in the event of location of the frame A in shallow streams or in the event of slow moving current and consequent ineffective rotation of the shaft 14 through the instrumentality of the water wheels 16 and 17 sufficient speed may be obtained through the instrumentality of the electric or other motor to drive the shaft 14 effectively.

For instance, reference to Fig. 7 will disclose sufficient of the structure previously described and illustrated to indicate one form of means whereby the shaft 14 may be driven by the electric motor 25. A battery 26 is arranged in a circuit 27 in which a switch 28 is arranged. The motor shaft 29 may have a clutch connection 30 with a

shaft 31 which is journaled in an arm 32 of a bracket 33 secured in any suitable manner on the frame A. A bevelled gear 34 on the outer end of the shaft 31 meshes with a bevelled gear 35 on a shaft 36 and journaled in an arm 37 of the aforesaid bracket 33 and has a bevelled gear connection 38 with a shaft 14. Any other suitable connections may be arranged between the motor 25 and the shaft 14 for driving the latter and it will be understood in reference to Fig. 7 that only sufficient illustration of the frame has been made to clearly illustrate the location and arrangement of the connections between the electric motor and the shaft 14.

15 What is claimed is:—

1. An apparatus of the character described comprising a frame adapted for location in a stream of water and including rearwardly diverging side members and an upwardly bowed connection between the rear ends of the diverging side members, a plate forming a floor mounted on the diverging members and terminating short of said bowed member and at its rear edge having slits therein, a rotatable shaft journaled on said frame and extending parallel with and close to the rear edge of said floor plate, means for rotating said shaft, magnetized elements removably mounted on said shaft and operating in the respective slits of said floor plate to magnetically attract magnetic sands in the stream and carry the same by a magnetic attraction upwardly above said frame, knife blades adjustably mounted on said floor plate on opposite sides of said magnetized elements and operable to remove from said magnetized elements materials held by magnetic attraction thereto to automatically effect deposit of such materials on said floor plate.

2. An apparatus of the character described comprising a frame adapted for location in a stream of water and including rearwardly diverging side members and an upwardly bowed connection between the rear ends of the diverging side members, a floor plate mounted on the diverging members and terminating short of said bowed member and at its rear edge having slits therein, a rotatable shaft journaled on said frame and extending parallel with and close to the rear edge of said floor plate, means for rotating said shaft, magnetized wheels removably mounted on said shaft and operating in the respective slits of said floor plate to magnetically attract magnetic sands in the stream and carry the same by magnetic attraction upwardly above said frame, knife blades adjustably mounted on said plate on opposite sides of said wheels to remove from the

wheels materials held by magnetic attraction thereto to thereby automatically effect deposit of such materials onto said floor plate, longitudinally disposed troughs carried by said floor plate in front of said wheels in an upstream direction, and a transversely disposed trough carried by said floor plate and having communication with said longitudinally disposed troughs.

3. An apparatus of the character described comprising a frame adapted for location in a stream of water and including rearwardly diverging side members and a connection between the rear ends of the diverging side members, a floor mounted on the diverging members and terminating short of said connection at the rear of the diverging members and having a slit therein, a rotatable shaft journaled on said frame and extending parallel with and relatively close to the rear edge of said floor, means for rotating said shaft, a magnetized element removably mounted on said shaft and operating in said slit of the floor to magnetically attract magnetic sands in the stream and carry the same by magnetic attraction upwardly above said frame, knife blades adjustably mounted on said floor on opposite sides of said magnetized element to coact therewith to remove from said element materials held by magnetic attraction thereto to thereby automatically effect deposit of such materials on said floor, a longitudinal trough on the floor in front of said magnetized element, and another trough on said floor and having communication with the aforesaid trough.

4. An apparatus of the character described comprising a frame adapted for location in a stream of water and including a frame, a floor member having slits at its rear edge, troughs extending forwardly from the rear edge of said floor on opposite sides of said slits, the ends of the troughs at the rear of the floor being closed and the opposite ends of the troughs being open, a rotatable shaft journaled on said frame and extending parallel with and relatively close to the rear edge of said floor, means for rotating said shaft, magnetized elements carried by said shaft and operating in said slits of the floor to magnetically attract magnetic sands or the like in the stream and carry the same by magnetic attraction upwardly above said frame, knife blades disposed at an angle to the plane of the magnetized elements to coact with the latter to remove from said elements material held by magnetic attraction thereto to automatically effect deposit of said materials in the respective troughs.

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