Aug. 12, 1952 K. F. BRAUN ET AL 2,606,375

SCRAPER FOR RIVER BOTTOMS

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FIG. 1.

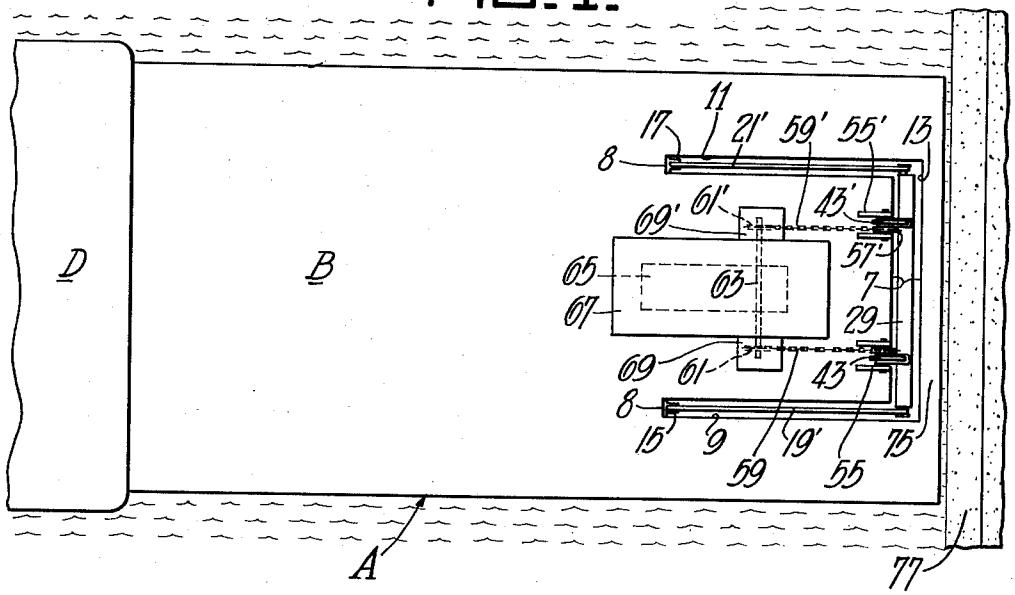
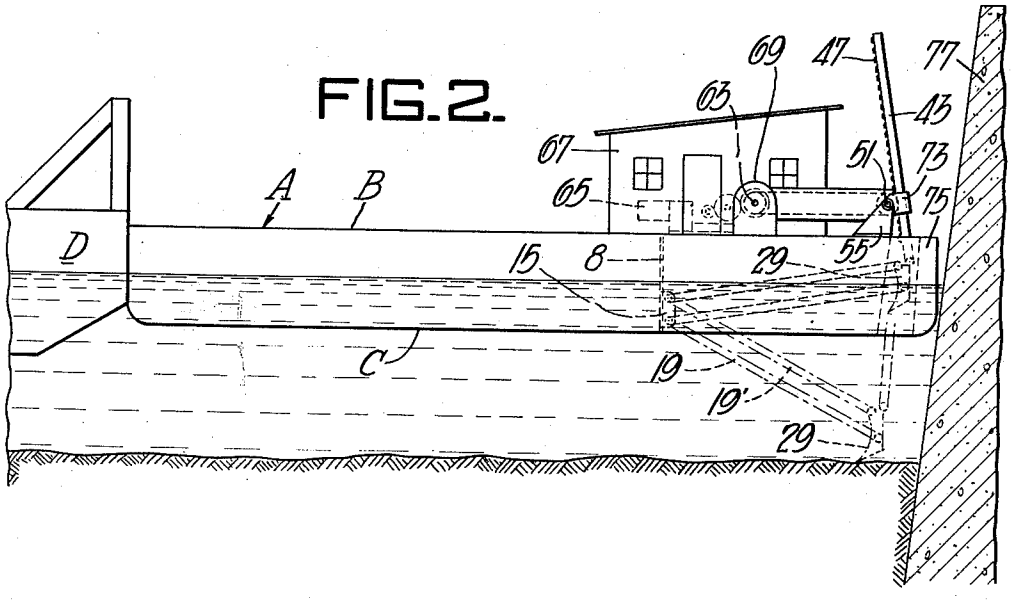


FIG. 2.



Inventors:
KARL F. BRAUN and
GEORGE T. GRIFFITHS,
by: Donald G. Dalton
their Attorney.

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FIG. 3.

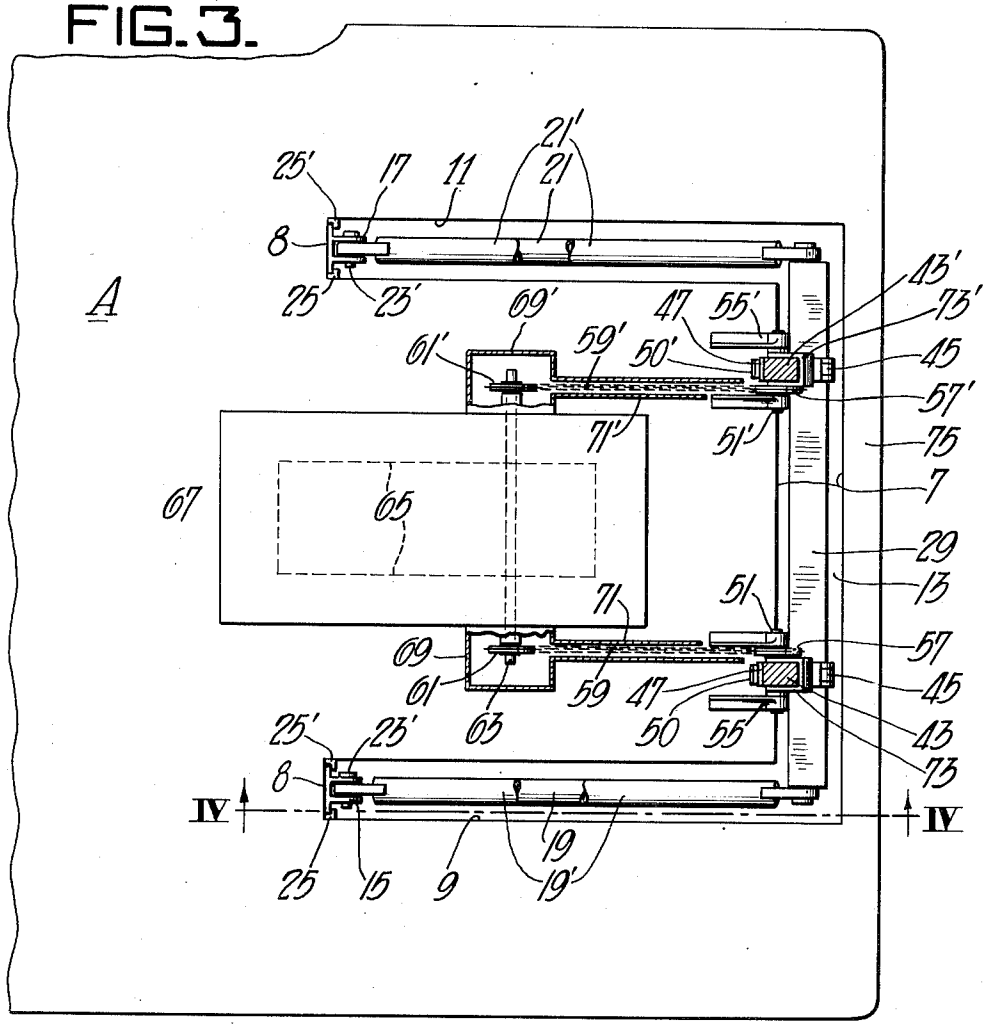
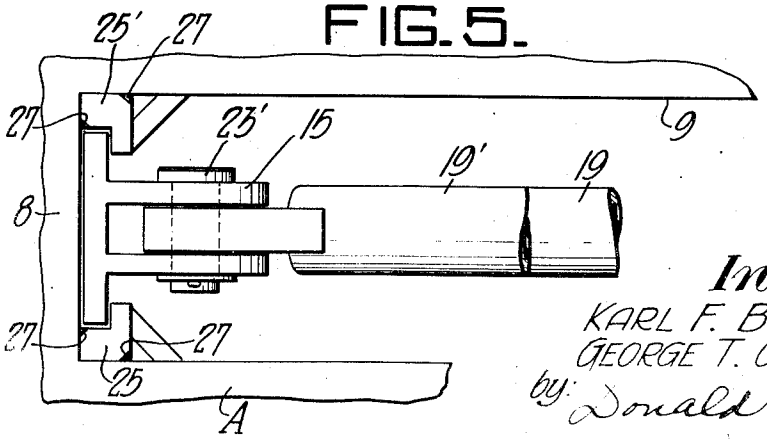


FIG. 5.



Inventors:
KARL F. BRAUN and
GEORGE T. GRIFFITHS,
by: Donald G. Dalton
their Attorney.

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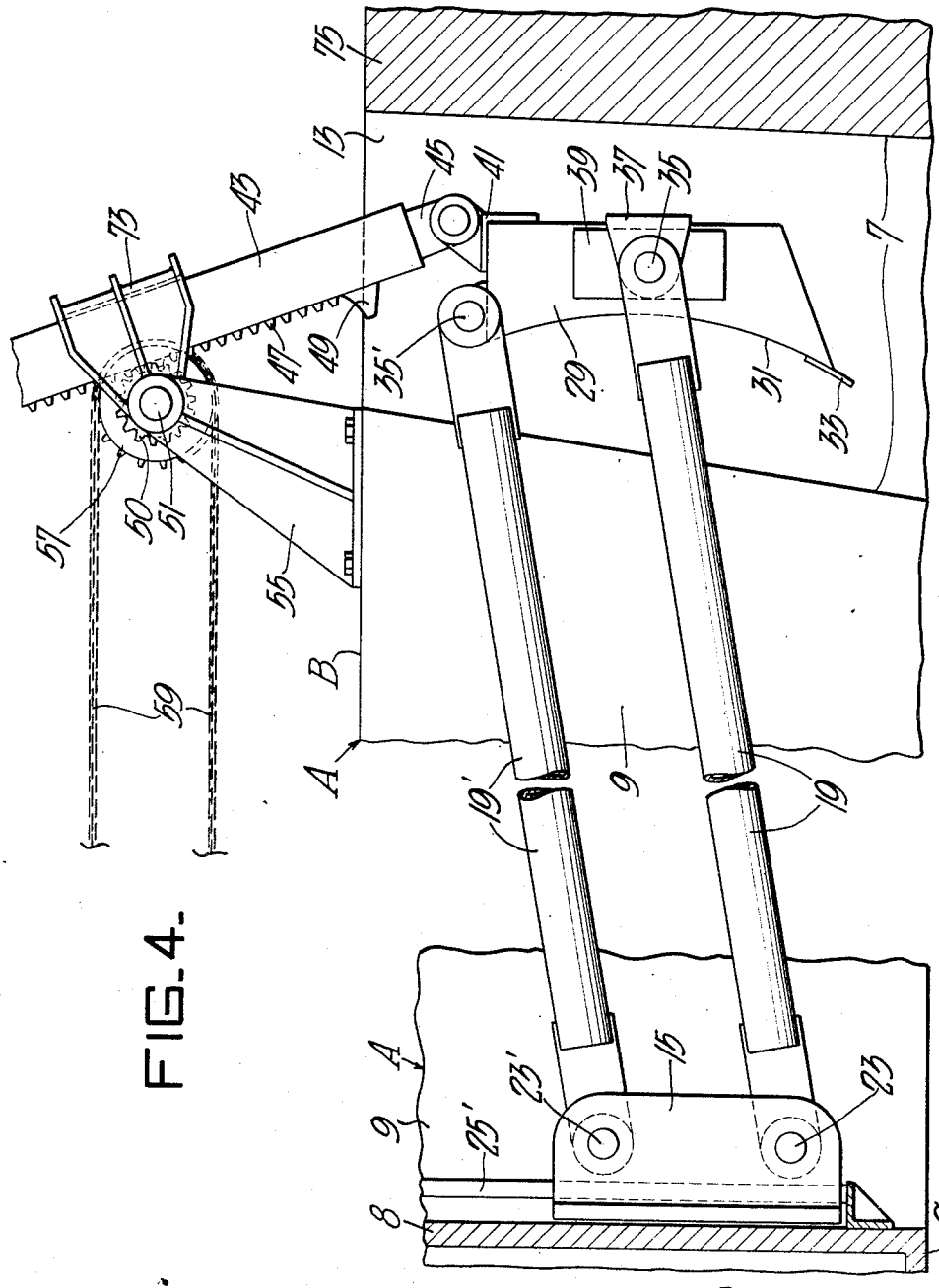


FIG. 4.

Inventors:
KARL F. BRAUN and
GEORGE T. GRIFFITHS,
by: Donald G. Dalton
their Attorney.

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SCRAPER FOR RIVER BOTTOMS

Karl F. Braun, Clairton, and George T. Griffiths, McKeesport, Pa., assignors to United States Steel Company, a corporation of New Jersey

Application January 23, 1947, Serial No. 723,838

4 Claims. (Cl. 37—75)

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The present invention relates to improved construction of a floating dredge for deeping river bottoms that have become unduly filled with loose material such as mud and silt for rendering the depth of the water too shallow for effective maneuvering of vessels being docked.

In certain locations, for example, coal for coking is transported from the mines to the coke works in barges of from 800 to 900 tons capacity. These loaded barges, requiring a depth of about ten feet of water, are spotted along the concrete river wall where they are unloaded by coal hoists. Because of this it is necessary to maintain sufficient depth in the harbor to permit free movement of the loaded barges at all times. Since the river bottom builds up with mud or silt, it becomes necessary to dredge or scrape the bottom, depending on the desired extent of material to be removed.

The present invention provides an improved dredge-type vessel and scraper mechanism which has for one of its objects the protection of the scraper mechanism from damage by accidental impacts against the river wall.

A further object of the invention is the provision of an improved scraper blade that minimizes spillage of material over the top of the blade thereby increasing effectiveness of the scraping operation.

A further object of the invention is to provide mechanism for holding the scraper blade in a fixed position of elevation, so that it will not ride over hard areas or sink into soft spots in the river bottom.

The invention, then, comprises the features hereinafter described and as particularly pointed out in the claims, the following description and the annexed drawings setting forth in detail certain illustrative embodiments of the invention, these being indicative of several of the number of ways in which the principles of the invention may be employed.

In said drawings:

Figure 1 is a plan of a dredge-type vessel embodying the apparatus of the present invention;

Figure 2 is a side elevation of the showing of Figure 1;

Figure 3 is an enlarged fragmentary plan of the right-hand portion of Figure 1;

Figure 4 is an enlarged fragmentary elevation of the blade-supporting mechanism shown in Figure 3; and

Figure 5 is an enlarged fragmentary plan of a detail of construction.

Referring more particularly to the drawings,

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the illustrative embodiment of the present invention discloses a vessel, the same comprising a hull A, deck B and bottom C. The construction of the apparatus of the present invention is shown as embodied in a scow-type of hull which is maneuvered by an external motivating unit such as the steamboat D. The structural details of the hull form no part of the present invention, and accordingly are not shown beyond the forward transverse wall or bulkhead 8 on which there are mounted certain of the mounting instrumentalities for the scraper blade which form part of the apparatus of the invention.

In the fore-quarter part of the hull there is provided a U-shaped well 7, having pairs of parallel arms 9 and 11 as shown, the connecting portion of the said U-shaped well being indicated at 13.

In each of the well arms 9 and 11, there is welded to the transverse wall or bulkhead 8 a double bracket, the same being indicated at 15 and 17, respectively. Each of these double brackets (i. e. 15 and 17) pivotally mounts a spaced pair of supporting arms 19, 19', and 21, 21', the pivotal connections between the pairs of the supporting arms and the respective brackets comprising pins 23, 23'. Preferably, too, the brackets 15 and 17 are removably mounted in holding guides 25, 25' which are welded, as at 27, to the bulkhead 8.

To the extending ends of the supporting arms 19, 19' and 21, 21', there is pivotally connected a scraper blade 29 which has a curved scraping face 31 and a detachable cutting edge 33. These pivotal connections for the supporting arms 19, 19' to the scraper blade 29 are through pins 35, 35' which are removable. While not shown in the drawings, similar pin connections are provided for the opposite side of the blade for the other pair of supporting arms (i. e. 21 and 21').

One of the pivotal connections 35' is at the top of the curved surface of the blade, the other connection being approximately mid-point laterally of the scraper blade. A reinforcing band 37 extends around the substantially flat forward surface of the scraper blade, being secured thereto by suitable connecting means, such as bolts (not shown). There is interposed between the reinforcing band 37 and the sides of the scraper blade a wear plate 39 (one at each side) for taking wear between the scraper blade and the mounting arms during operation of the blade. These wear plates 39 are permanently attached to the scraper blade in any suitable manner, as for example by welding. Corre-

sponding brackets 41 are welded to the scraper blade adjacent its top forward corners, serving as a pivotal mounting for each of a pair of rack columns 43 and 43', the pivotal mountings 41 being connected to the rack columns 43, 43' by similar connecting links, such as shown at 45, each of these links being tightly fitted into the bottom end of the rack columns, as shown in Figure 4.

It will be readily understood that all structural features are duplicated on each side of the apparatus hereinbefore described.

The rack columns 43, 43' are provided with similar rack facings, such as shown at 47, and similar end stops, such as shown at 49. The rack facings 47 engage the teeth of rack pinions 50, 50' that are mounted on stub shafts 51, 51'. These stub shafts are mounted in turn on the upper ends of the bearing stands 55, 55' that are mounted on the deck of the hull at an angle as shown in Figure 2. The shafts 51, 51' also carry sprocket wheels 57, 57' over which pass sprocket driving chains 59, 59'. These chains also pass over sprockets 61, 61' mounted on a shaft 63, this shaft being suitably driven by an engine 65 mounted on the deck B in an enclosure or housing 67. The sprockets 61, 61' are enclosed in guard housings 69, 69' on the deck B, and guards 71, 71' are provided for chains 59, 59'.

It will be seen from the drawings that the bearing stands 55, 55' also guide sleeves 73, 73' for the rack columns. These sleeves 73, 73' are pivotally mounted on the shafts 51, 51' of bearing stands 55, 55', as shown in Figure 2.

From the drawings, it will also be seen that when the scraper blade 29 is raised to inoperative or idle position it occupies the cross portion 13 (see Figure 4) of the U-shaped well that connects the arms 9 and 11. The U-shaped well 7 is entirely enclosed within the hull A and the mechanism in the well and on the deck are protected by heavy sections of the hull from contact with any obstacles. The thick bow portion 75 intervenes between the raised scraper blade 29 and any other obstruction, such as the river wall 77 adjacent to which the scraping operations are to proceed. It will be observed further that no part of the mechanism extends beyond the lines of the deck A.

From the foregoing construction and arrangement of elements, the operation of the apparatus will be readily understood, and need be referred to only briefly as follows.

For deepening operations on a river bottom, the vessel is towed by a steamboat D, or other propulsion instrumentality, to the desired site in the harbor and then is pushed against the river wall by the steamboat so that the scraper blade 29 is parallel thereto. From soundings taken previously, the depth of the first cut is determined and the scraper blade is set accordingly.

This is done by starting the engine 65, which rotates the shaft 63 by conventional power-transmission instrumentalities. Rotation of the shaft 63 drives the sprockets 61, 61', thereby actuating sprocket chains 59, 59' and driving sprockets 57, 57' on shafts 51, 51' in the bearing stands 55, 55', thus rotating the shafts 51, 51'. Rotation of these shafts 51, 51' rotates rack pinions 50, 50' to lower the rack columns 43, 43', which are held in alignment by the double acting guide sleeves 73, 73'. This, of course, lowers the scraper blade 29 to operative position on the river bottom, the parallel supporting arms 19, 19', 21, 21' guiding the movement of the blade into operating position.

When the desired depth of the blade 29 is reached, the engine 65 is stopped, and the blade is held in a fixed and rigid position.

The steamboat D, which remains coupled to the stern of the hull A, then pulls the scraper away from the wall or harbor until the scraped materials are deposited in the most adjacent deep portions of the river bottom. The steamboat then reverses and pushes the scraper back against the river wall. During this time the scraper blade is raised by the same mechanism that lowered it, reversely operated. The operations as described are repeated, with the mechanisms reversed. It will be observed that the curved surface 31 of the scraper blade serves to impart a rolling action to the materials being moved and lessens the spillage over the top of the blade.

The double supporting arms 19, 19' and 21, 21' will keep the scraper blade 29 of the unit A in the same vertical position regardless of depth.

While we have shown and described certain specific embodiments of the present invention, it will be readily understood by those skilled in the art that we do not wish to be limited exactly thereto, since various modifications may be made without departing from the scope of the invention as defined in the appended claims.

We claim:

1. A vessel for scraping bottoms of rivers and harbors for removing deposits of mud and silt, which comprises a hull having a bow portion, a stern portion, and substantially parallel sides, a U-shaped well extending vertically through the hull composed of substantially parallel branches extending longitudinally in the hull substantially parallel to the sides of the hull, and a transversely connecting portion for the branches extending parallel to the bow of the hull transversely of the hull, a bulkhead extending transversely through the hull, a scraper blade positioned when in inoperative position in the connecting portion of the well and closed in the hull and when in operative position at a predetermined depth below the hull, at least two vertically parallel supporting arms extending longitudinally through each of the longitudinal well branches, the said scraper blade having a curved cutting surface and an approximately planar forward surface, pivotal connecting means for the upper supporting arm in each well at each top corner of the curved surface of the scraper blade, another of such means for the lower supporting arm in each of said longitudinal wells being approximately at mid-position vertically on the blade, a pair of rack columns pivotally connected to the blade adapted to shift the blade vertically between inoperative and operative positions, mounting means on the deck for the rack columns, a rack face on each of the rack columns, shaft instrumentalities in the mounting means, sleeve guide means pivotally mounted on said shaft instrumentalities for maintaining the rack columns in alignment during shifting of the rack columns and blade, a rack pinion on the shaft instrumentalities engaging each of the rack faces, sprocket means on the shaft means for operating the shaft means, and drive mechanism for the sprocket means.

2. A vessel for scraping river bottoms for removing deposits of mud and silt, which comprises a hull having a bow portion, a stern portion, and substantially parallel sides, a U-shaped well extending vertically through the hull composed of substantially parallel arms extending longitu-

dinally in the hull substantially parallel to the sides of the hull and a transversely connecting portion for the arms extending parallel to the bow of the hull transversely of the hull, a bulkhead extending transversely through the hull, a scraper blade positioned when in inoperative position in the connecting portion of the well and enclosed in the hull, supporting means for the blade extending longitudinally through the parallel arms of the well, the supporting means being pivotally secured to the bulkhead, mechanism for vertically lowering the blade from inoperative position in the well to a predetermined depth below the hull, said mechanism comprising a pair of rack columns pivotally connected to the blade, mounting means on the deck for the rack columns, a rack face on each of the rack columns, shaft instrumentalities in the mounting means, sleeve guide means pivotally mounted on said shaft instrumentalities for maintaining the rack columns in alignment during shifting of the rack columns and blade, a rack pinion on the shaft instrumentalities engaging each of the rack faces, sprocket means on the shaft means for operating the shaft means, and drive mechanism for the sprocket means.

3. A vessel for scraping river bottoms for removing deposits of mud and silt, which comprises a hull having a bow portion, a stern portion, and substantially parallel sides, a U-shaped well extending vertically through the hull composed of substantially parallel branches extending longitudinally in the hull substantially parallel to the sides of the hull and a transversely connecting portion for the branches extending parallel to the bow of the hull transversely of the hull, a bulkhead extending transversely through the hull, a scraper blade positioned when in inoperative position in the connecting portion of the well and enclosed in the hull and when in operative position at a predetermined depth below the hull, a pair of parallel supporting arms extending longitudinally through each of the longitudinal well branches, the said scraper blade having a curved cutting surface and an approximately planar forward surface, pivotal connecting means for the upper supporting arm at each

top corner of the curved surface of the scraper blade, another of such means for the lower supporting arm at the mid-portion vertically of the blade, mechanism for vertically shifting the blade between inoperative and operative positions, and actuating instrumentalities for the said mechanism.

4. An apparatus for scraping river bottoms and the like comprising a floating vessel having a hull with a bow portion and a stern portion, a vertical bulkhead extending transversely through said hull, an enclosed U-shaped well in said hull, said well including a pair of spaced parallel arm portions extending longitudinally through the hull from said bulkhead toward the bow and a transverse portion connecting said arms and extending transversely through said hull parallel to the bow, scraper means in said well, said scraper means including a scraper blade located when in raised, inoperative position in the transverse portion of said well, and supporting means for said blade extending longitudinally in the parallel arms of said well, said supporting means being pivotally connected to said bulkhead, and operating mechanism for raising and lowering said scraper means, said mechanism being within the hull and vertical projections of the hull.

KARL F. BRAUN.
GEORGE T. GRIFFITHS.

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