2 Sheets—Sheet 1.

J. GRANT.

Dredging Apparatus.

No. 216,847. Patented June 24, 1879.

Fig. 1.

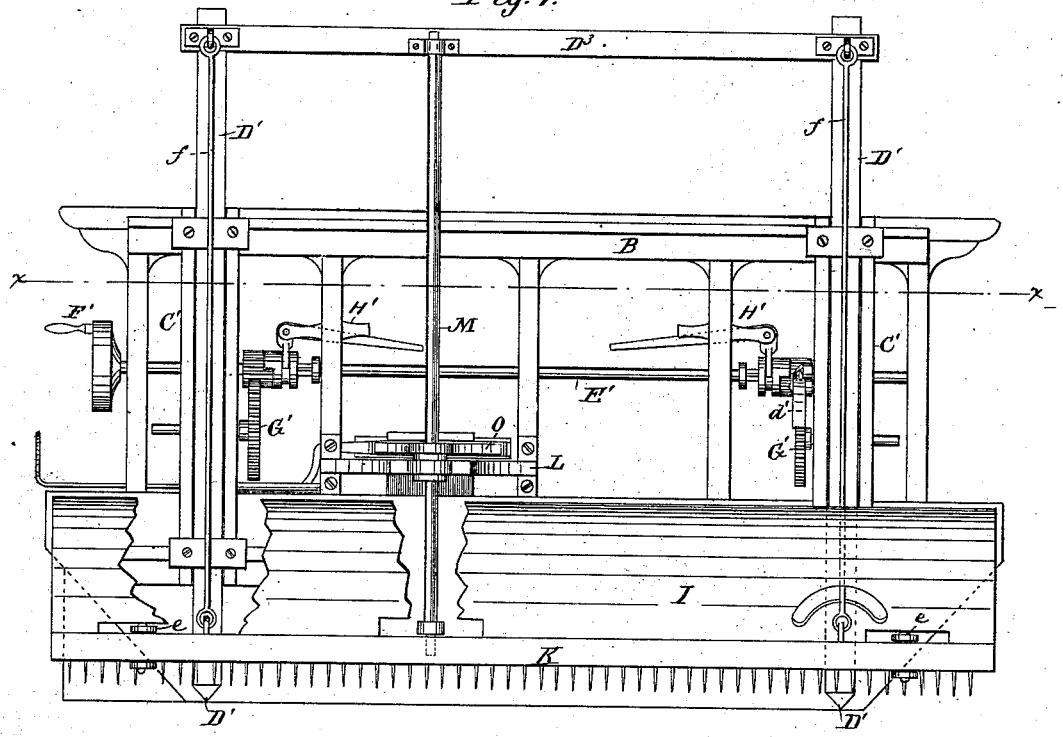
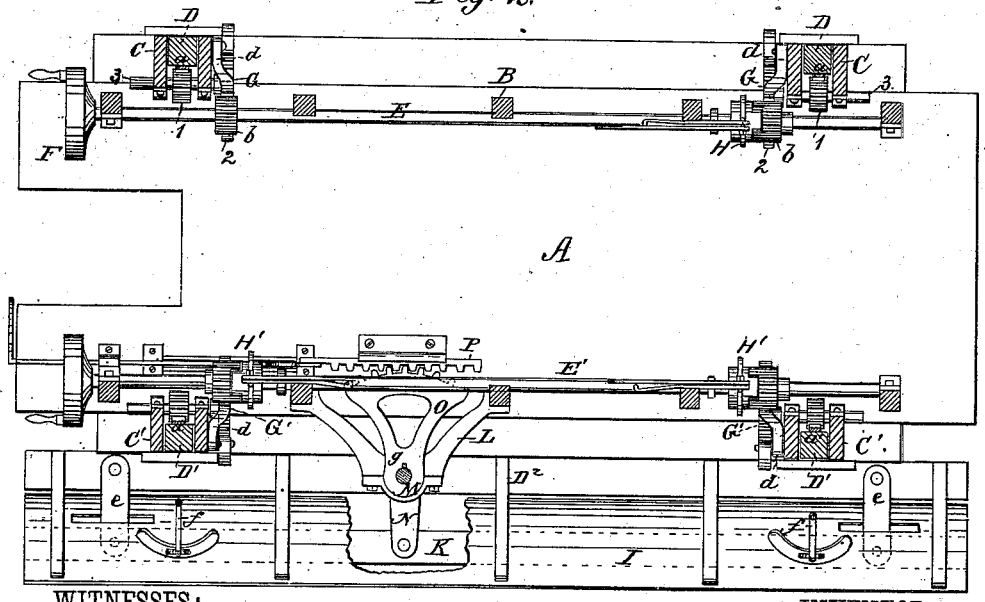


Fig. 2.



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2 Sheets—Sheet 2.

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Fig. 3.

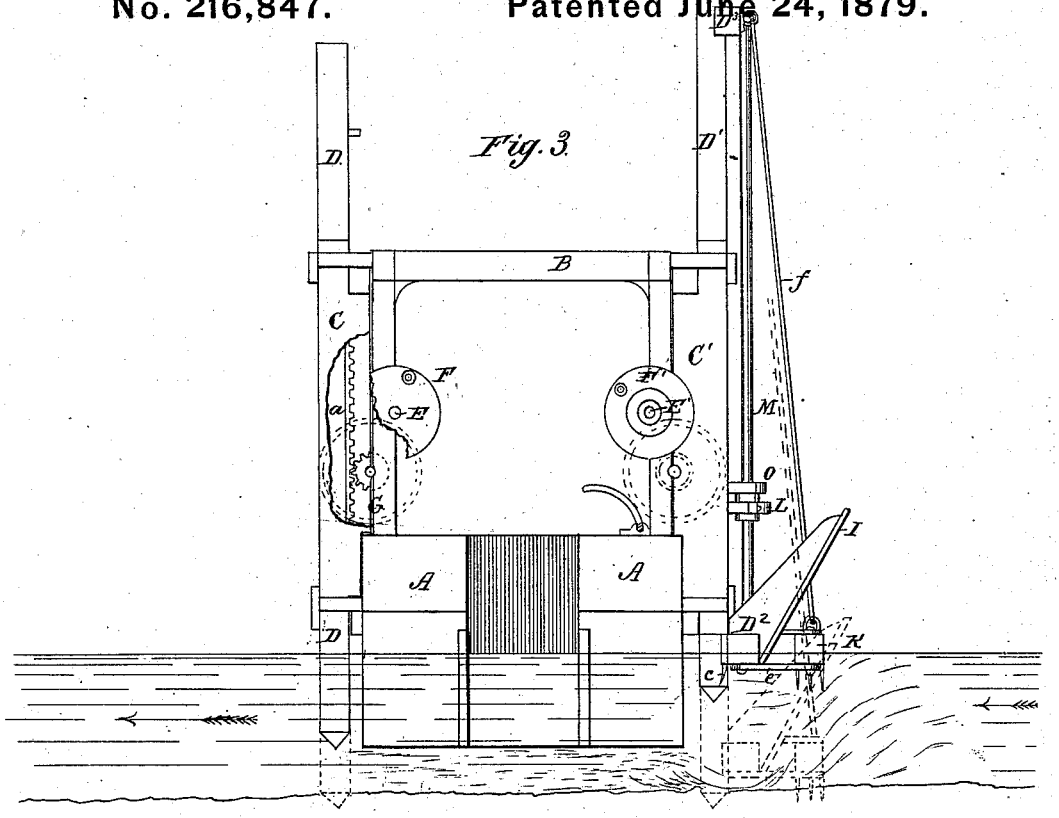


Fig. 4.

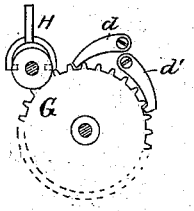
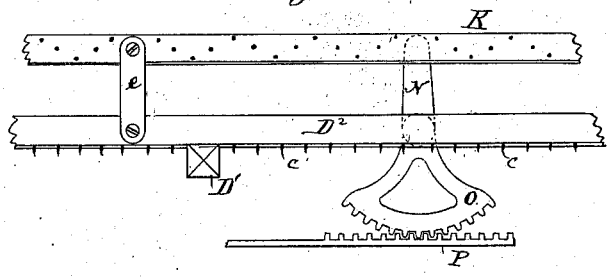


Fig. 5.



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UNITED STATES PATENT OFFICE.

JOHN GRANT, OF NEW ORLEANS, LOUISIANA.

IMPROVEMENT IN DREDGING APPARATUS.

Specification forming part of Letters Patent No. **216,847**, dated June 24, 1879; application filed May 16, 1879.

To all whom it may concern:

Be it known that I, JOHN GRANT, of New Orleans, in the parish of Orleans and State of Louisiana, have invented a new and Improved Dredging Apparatus; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a side elevation with parts of the deflecting-plate broken away. Fig. 2 is a horizontal section through the line *x x* of Fig. 1. Fig. 3 is an end elevation, showing, in dotted lines, the position of the dredging apparatus when acting upon the river-bed. Fig. 4 is a detail of the pawls employed at the spuds for holding them to their adjustments. Fig. 5 is an underneath view of the rake and connected parts.

My invention is an improvement upon the dredging apparatus for which Letters Patent were granted me July 18, 1876. The construction of the apparatus described in said patent contemplated the stirring up, washing away, and removing of sedimentary deposits in the beds of rivers by the action of the current; and to this end I employed, upon separate spuds on a floating hull, a series of disconnected vertically-adjustable deflecting-plates, arranged at an angle to the vertical line, and extending outwardly at the upper portions, with a series of teeth upon their bottom edges, so that when lowered upon the bar the current, in washing around and under the same, disintegrated the sand-bar and carried it away, the inclination of the plates serving to direct the current down against said bed, while the teeth upon the lower edge of the same served to assist, by both a positive direct action and by forming eddies in the sand around the said teeth.

In rendering this apparatus more efficient for this purpose, my present invention consists in a vertically-adjustable deflecting-plate extending throughout the broadside of the boat, and mounted upon a coextensive frame-work, which is sustained upon two sliding spuds, and is made vertically-adjustable as a whole. In making the deflecting-plates in disconnected and separated sections, as in my former patent, a large portion of the water passes around the edges of the said plates, instead of being thrown down against the bed of the river, where its active movement could be better utilized. By making the deflecting-surface continuous it will be seen that when the boat is anchored or its drifting movement retarded, the water from up stream is thrown in a continuous sheet against the bed of the river, and the full benefit of its action obtained.

The invention also consists in combining with such deflecting-plate a longitudinally-reciprocating rake, which is made adjustable with the deflecting-plate, and which is used to stir the bed whenever it is of such a nature as not to be easily disintegrated by the unassisted action of the water.

The invention also further consists in the peculiar means for operating and adjusting these parts, as will be hereinafter more fully described.

In the drawings, A represents the hull or body portion of a boat, upon which my improvements are mounted. This hull is preferably made of as light draft as possible, so that the water may readily flow under the same, and at its rear end is provided with a recess or inclosure to receive a propelling-wheel, which is to be brought into requisition in going up stream or in transporting the apparatus. Upon the deck of this vessel is erected a substantial frame-work, B, in which are formed the vertical guides C C C′ C′, in the first of which are arranged, upon one side of the boat, the vertically-adjustable spuds D D, which are employed to anchor or retard the movement of the boat and in the second of which guides, upon the other side of the boat, are arranged the vertically-sliding spuds D^1 D^1, which carry the dredging mechanism proper.

When in working position the boat is arranged with its broadside at right angles to the current, with the side carrying the dredging apparatus facing up stream. In this position it is held against the current by means of the adjustable spuds D D, which are pointed at their lower ends, and are sunken into the bed of the river. These spuds serve to anchor the boat more or less firmly, according to the nature of the bed to be operated upon; but ordinarily they do not positively hold the boat at a given point, but, by dragging in the bed, allow a retarded drifting motion of the boat,

which is to be regulated as to speed in proportion to the progress of the dredging action. For adjusting these spuds a shaft, E, is extended longitudinally along the side of the boat, and is held in bearings in the framework. This shaft is provided with a wheel, F, at one end for connecting it to the engine or prime mover, and is preferably operated by steam. In connecting this shaft to the spuds, the latter are provided with racks *a* and a cog-gear, G, consisting of a pinion, 1, and larger gear-wheel 2, fixed on the same shaft 3, serves to connect said racks with the pinion *b* on the shaft E. In effecting connection between the spuds and the shaft, a clutch mechanism, H, is employed at one or both of the spuds, so that one or both of the pinions on the shaft may be thrown out of gear. This permits the engine to act independently upon either of the spuds to adjust them to varying transverse depth in the channel, and permits one spud to be raised while the other is down, which furnishes means for swinging the boat around a bend with its broadside to the current, the spud which is down acting as a pivotal point for this purpose.

I is the inclined deflecting-plate, which extends the full length of the boat, and is attached to a horizontal frame, D^2, in such a manner as to have its upper edge project away from the boat. This frame D^2 is attached to the lower ends of the vertically-adjustable spuds D^1 D^1, which spuds are connected at the top by a horizontal beam, D^3, to form a rigid rectangular frame. To the bottom of the beam D^2, and near the lower edge of the deflecting-plate, are attached the downwardly-projecting rake-teeth *c*, which enter the river-bed and help to disintegrate the same. For raising and lowering the frame carrying the deflecting-plate, the vertically-adjustable spuds D^1 are provided with racks *a'* and a set of gear-wheels, G', and one or more clutches, H', are provided for each for connecting the same to a second shaft, E', in a manner similar to that for adjusting the anchoring-spuds on the other side. As, however, the two spuds D^1 on this side must always move together, both ends of the shaft must either be connected or both disconnected from the said spuds, and hence both ends of the shaft must have the same adjustment of clutch for operating both of said spuds together, or throwing both out of connection with the shaft. For holding the frame to its adjustment, two pawls, *d d'*, (see Fig. 4,) are employed, which are arranged to engage with one of the cog-wheels, and of which *d* serves to hold the frame up and *d'* to hold it down. The shaft on this side of the boat, like the shaft upon the other side, is provided with a wheel at its end for connecting it with the driving mechanism, and it is designed, also, to be operated by steam-power.

With respect to the merit of the single continuous deflecting-blade, as distinguished from the short disconnected and spaced or separated blades shown in my previous patent, I would state that the continuous blade throws a broad and uninterrupted volume of water directly against the bottom of the river, instead of allowing the larger volume of the same to pass through the spaces intervening between the separated section, as in my said patent. It also simplifies the gear, and reduces the number of spuds for sustaining and operating the plate.

For more speedily disintegrating the river-bed where it is of a tough or clayey consistency, I arrange upon the outside of the deflecting-plate a rake, K, extending the full length of the said plate, and hung near the bottom edge of the same, so that it rests upon the river-bed. This rake I connect to the lower frame, D^2, by links or swinging arms *e e*, extending through slots in the deflecting-plate, and to the upper portion of the frame by loosely-jointed suspending-rods *f f*, which carry the greater portion of the weight. For imparting a reciprocating motion to the rake, a horizontal offsetting-frame, L, is attached to the timbers of the boat, and is provided at its outer end with a bearing, through which there extends a vertical rock-shaft, M, stepped in a bearing in the lower frame, D^2, and arranged in a box, also at the top of the frame. This shaft is provided at the bottom with a rigid arm, N, which is loosely jointed to the rake, and has upon one side, and extending through the middle bearing, a feather or rib, *g*. Encompassing this shaft at its middle bearing is a toothed segment, O, which has a sleeve that oscillates in the middle bearing, and is formed with a slot or groove corresponding to the feather on the shaft, so that while said shaft may be adjusted vertically through the sleeve of said segment, the oscillations of the latter are imparted to the shaft, and through it to the rake. This segment is held to the bearing by a collar on the under side of its sleeve, so that it cannot move vertically with the shaft, and its toothed surface is made to engage with a reciprocating rack-bar, P, moving in guides, and operated by a steam-piston or other driving mechanism.

This rake, it will thus be seen, is adjusted vertically with the frame carrying the deflecting-plate, and provides a means for disintegrating the river-bed which is simple, efficient, and liable to but little derangement or wear.

In some uses of my invention, when a wide channel is to be cleaned out, the boat may have two or more sections of the deflecting-plates and rakes, their ends being brought sufficiently close together to form a practically continuous deflecting-plate and rake.

The distinguishing point between this modification of my invention and my prior patent is, that the sections of deflecting-plates are not separated or removed from each other, as in said patent, and the sections are supported upon two vertical spuds and a lower frame, which adds greatly to their strength and free-

dom from derangement, as well as to their efficiency for the work for which they were designed.

Having thus described my invention, what I claim is—

1. A dredging apparatus consisting of an inclined continuous deflecting-plate, combined with and mounted upon a horizontal frame, D^2, the vertically-adjustable carrying-spuds D^1 D^1, connected at the top by beam D^3, together with mechanism for raising and lowering the same, substantially as described.

2. The combination, with the inclined deflecting-plate arranged, as described, to throw the water against the river-bed, of a reciprocating rake arranged upon the outside of the plate, near the bottom thereof, for disintegrating the bed, as shown and described.

3. The combination, with the vertically-adjustable frame and the attached deflecting-plate, of the reciprocating rake, the vertical shaft M, having arm N, connected with said rake, the toothed segment O, having a feather-and-groove connection with said shaft, and a reciprocating rack meshing with the toothed segment, substantially as and for the purpose described.

The above specification of my invention signed by me this 14th day of May, 1879.

JOHN GRANT.

Witnesses:
EDWD. W. BYRN,
SOLON C. KEMON.