No. 805,965. PATENTED NOV. 28, 1905.

F. A. JONES.

DREDGING APPARATUS.

APPLICATION FILED MAY 20, 1905.

3 SHEETS—SHEET 1.

Fig. 1.

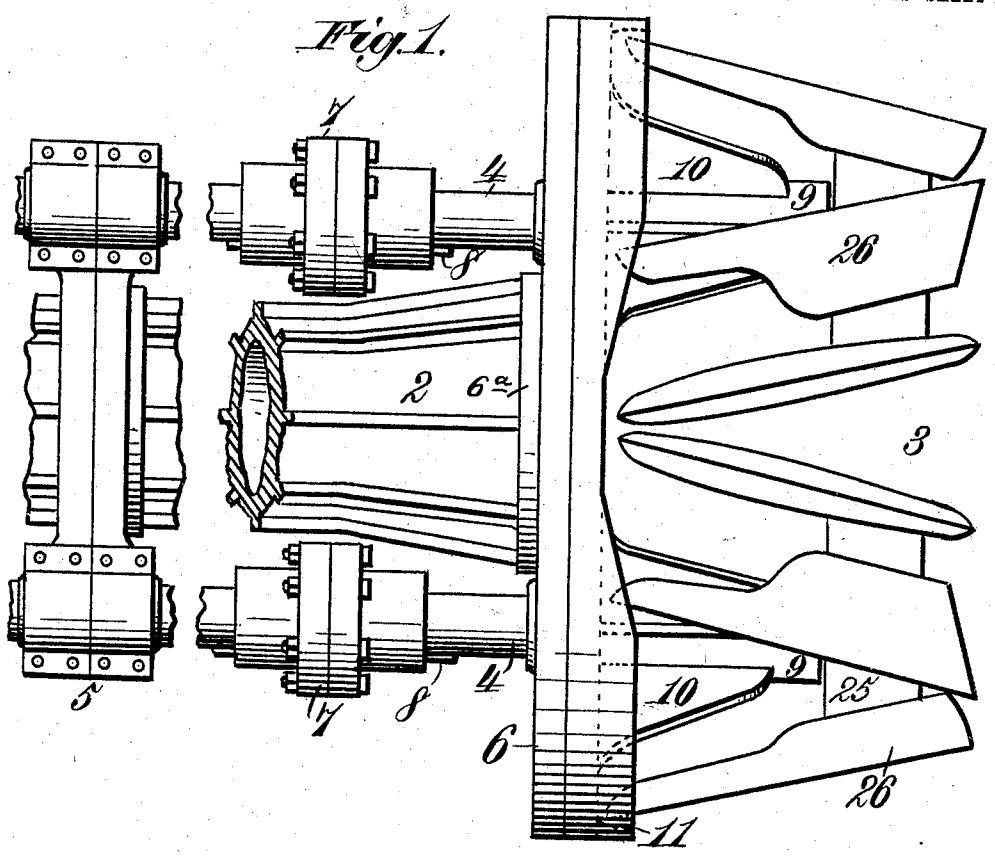
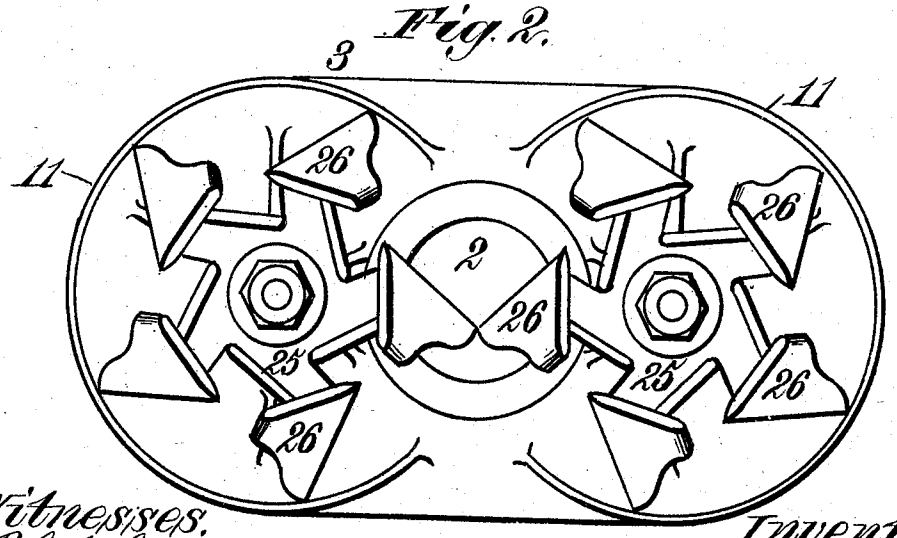


Fig. 2.



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3 SHEETS—SHEET 2.

Fig. 3.

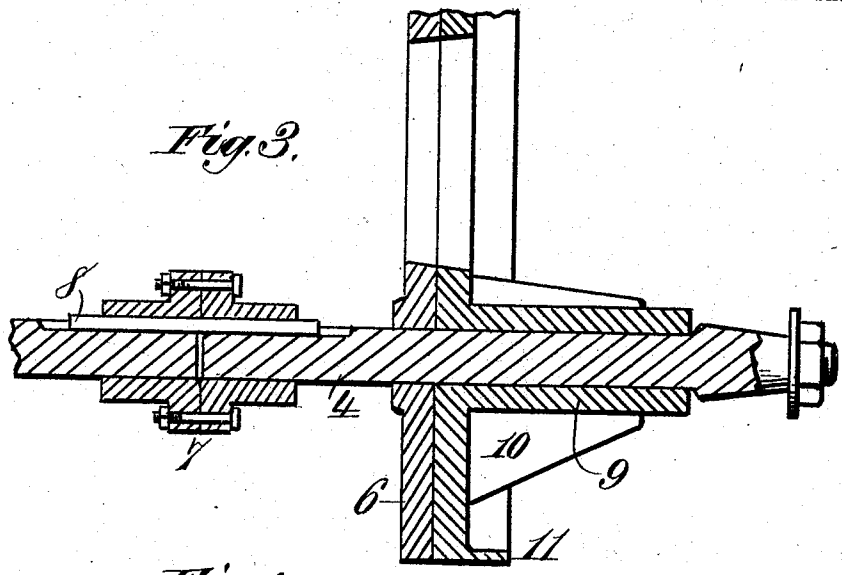


Fig. 4.

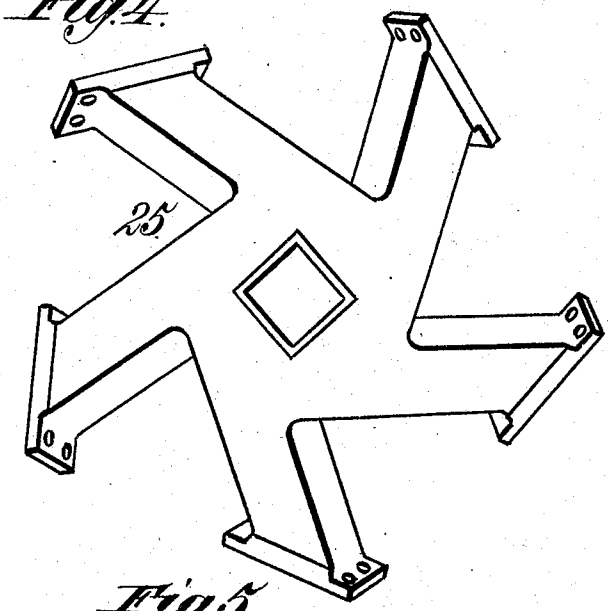
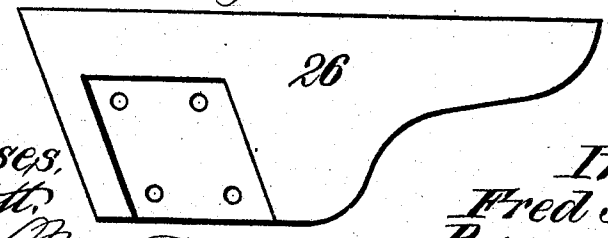


Fig. 5.



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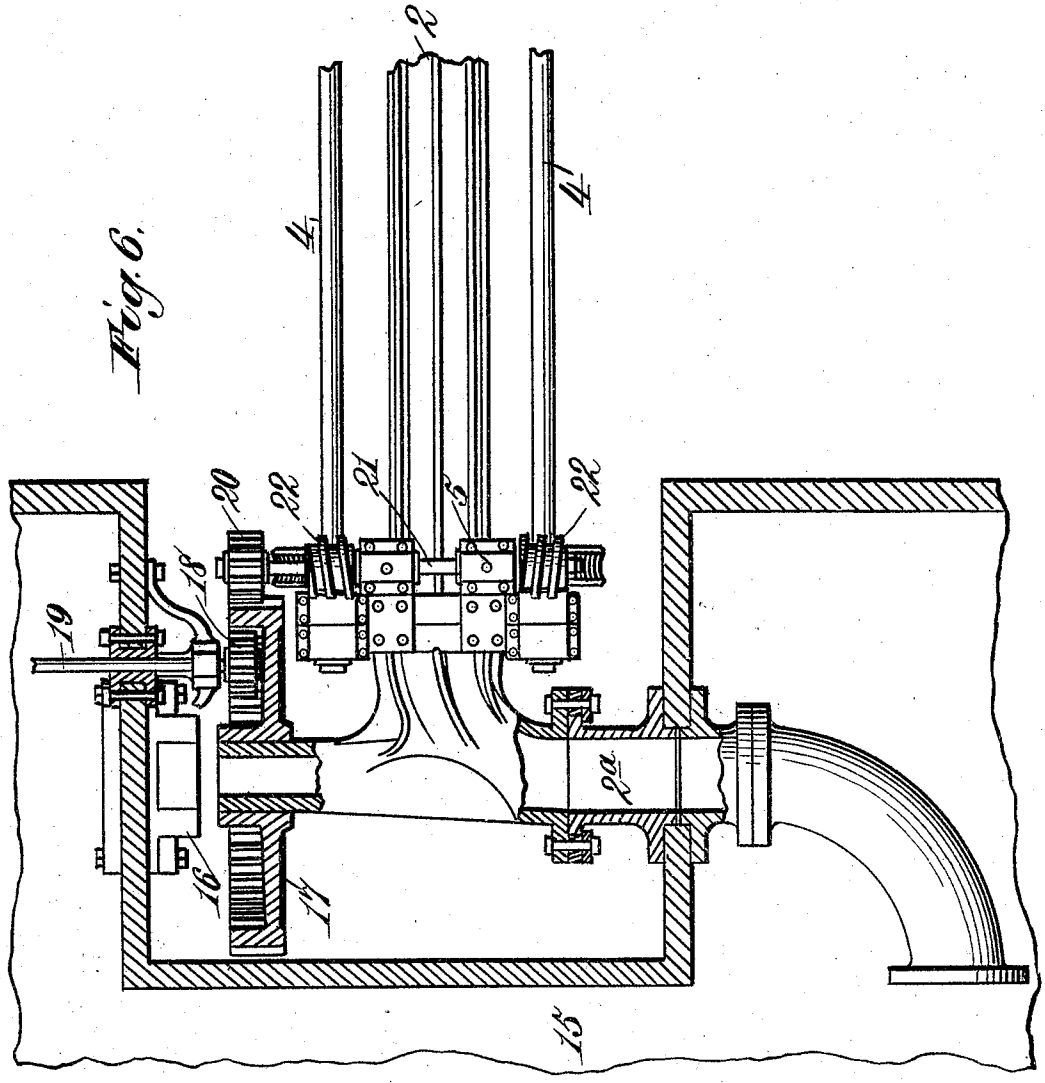
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3 SHEETS—SHEET 3.

Fig. 6.



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UNITED STATES PATENT OFFICE.

FRED A. JONES, OF HOUSTON, TEXAS.

DREDGING APPARATUS.

No. 805,965. Specification of Letters Patent. Patented Nov. 28, 1905.

Application filed May 20, 1905. Serial No. 261,458.

To all whom it may concern:

Be it known that I, FRED A. JONES, a citizen of the United States, residing at Houston, in the county of Harris and State of Texas, have invented new and useful Improvements in Dredging Apparatus, of which the following is a specification.

This invention relates to a dredging apparatus, the object of the invention being to provide an apparatus of this character which is effective in operation and wherein the moving parts are supported in a substantial solid manner.

The invention involves other advantages, which with the foregoing will be considered at length in the following description, while what I consider to be novel will be set forth in the claims succeeding said description. In the latter I will set forth in detail that form of embodiment of the invention which I have selected for illustration in the accompanying drawings, forming a part of this specification.

In the drawings, Figure 1 is a top plan view of a dredging apparatus including said invention. Fig. 2 is a front elevation of the same. Fig. 3 is an enlarged sectional detail view showing a cutter-shaft and a manner of supporting the same. Fig. 4 is an enlarged detail view of a spider. Fig. 5 is a similar view of a cutter-blade. Fig. 6 is a sectional plan view of the apparatus, showing a way of connecting the suction-pipe thereof with a dredge-boat.

Like characters refer to like parts throughout the different views.

The present invention is of the hydraulic-suction type, and involves in its make-up a suitable suction-pipe, such as that denoted in the drawings by 2. This suction-pipe, as is the case with apparatus of a similar character, is arranged for swinging movement and is associated with a scow, dredge-boat, or float, hereinafter more particulary described. In that form of embodiment illustrated, as will hereinafter appear, there are two cutters, and as the suction-pipe swings the excavating or digging will be done almost entirely by the leading cutter, while the other cutter will assist in directing the mass loosened up into the entrance of the suction-pipe. The two cutters are denoted in a general way each by 3, and they are carried upon shafts arranged in parallelism and extending longitudinally of and supported by bearings carried by the suction-pipe 2. The inner bearings are shown at 5, while the outer bearing, or the one that supports the shafts 4 adjacent to their outboard ends, is represented at 6. The outer bearing 6, which is represented as consisting of two plates fitted face to face and of substantially equal superficial area, has a hole centrally through the same of tapered form to be driven onto the extreme outer end of the suction-pipe, the bearing 6 being bolted, riveted, or otherwise suitably attached to the suction-pipe, although this is not essential. To unite the bearing 6 with the suction-pipe, the latter is represented as having (see Fig. 1, for example,) a circumferential flange 6^a near its mouth, through which the bolts, rivets, or other fastening means, to which reference has been had, can be passed.

Each shaft 4 consists of sections united together by couplings, as 7. (See Fig. 3, for example.) Where the sections of each shaft 4 abut or approximately abut, they have complemental channels, constituting a key-seat to receive a key, as 8. The key portion of each shaft is surrounded by the coupling 7, the latter consisting of two abutting peripherally-flanged sleeves, through the flanges of which bolts or their equivalents can be passed. By this means the bearing 6 and outer sections of the two shafts 4 can be disconnected from the suction-pipe bodily. The keys 8 take the strain due to the rapid rotation of the shafts from off the bolts of the couplings. As the bearing 6 is supported by the substantial suction-pipe and as it sustains the outer ends of the two shafts, the latter will be held to their work in a positive and true manner. As indicated, the outer bearing 6 is composed of two plates fitted face to face, the outer face of the outer plate having outwardly-projecting elongated hubs 9, through which the shafts 4 pass. The outer plate of the bearing 6 is provided externally with perpendicular flanges 10, integral therewith and also with and extending along the respective hubs 9, so as to provide for a braced bearing. The inner flanges 10 are of less width than the outer flanges, as will be clearly evident upon an inspection of Figs. 2 and 3, so as not to interfere with the suction-pipe nor with the entrance of loosened-up material thereinto.

Upon the bearing 6 externally thereof are two flanges, each denoted by 11 and arranged at opposite sides of the longitudinal axis of the suction-pipe. These flanges are part annular—that is, they are not continuous. Their ends extend short of the suction-pipe, so as to leave delivery-spaces, as the two flanges pre-

sent, in effect, funnels, which aid in guiding the material into the inlet of the suction-pipe. These flanges also serve as guards for the protection of the inner ends or points of the cutter-blades, which are represented as extending longitudinally of the suction-pipe, although at an angle thereto. It will be perceived upon an inspection of Fig. 1, for example, that the said flanges practically surround said inner ends.

I have shown in Fig. 6 of the drawings a scow, dredge-boat, or float, the same being denoted by 15, and with it is associated the suction-pipe 2. The suction-pipe 2 is composed of several sections, the outermost one of which has a swiveled connection with the stationary section 2^a, directly supported by the boat or scow 15. The outer swinging section of the suction-pipe in addition to its swiveled connection with the suction-pipe section 2^a also has a lateral journal supported for rocking motion by a bracket, as 16, set in an aperture in the dredge-boat. Carried by the laterally-projecting portion of the inner end of the swinging suction-pipe in some fixed manner is a gear, as 17, having internal teeth to mesh with the external teeth of a pinion 18 on a shaft 19, supported by suitable bearings upon the boat. The gear 17 has external teeth which mesh with a pinion 20, supported by a shaft 21, carried by the innermost bearing 5. It therefore follows that when the shaft 19 is driven the shaft 21 through the train of intermediate gears will be also operated. The shaft 19 may be rotated by an electric motor or one of any other suitable kind carried upon the dredge-boat. I do not deem it necessary to illustrate any motor for rotating the shaft 19. The shaft 21 is provided with two worms, each designated by 22, fixed thereto in some desirable manner, and of opposite pitch, said worms meshing with worm-gears fastened to the shafts 4 near their inner ends. By virtue of the described organization it will be apparent that when the shaft 19 is set in motion the shafts 4 will be oppositely rotated in order to oppositely rotate the two cutters 3, carried at the extreme forward ends of said shafts.

Rigidly fastened to the outer ends of the shafts 4 are the bodies of the two cutters. This rigid attachment may be of any desirable kind, although I will hereinafter describe a convenient way of operatively associating the bodies and their shafts. Said bodies are represented as consisting of spiders 25. (See Fig. 4, for example, where one of them is shown in detail.) A spider will consist of a central hub and a number of arms extending tangentially or angularly to the hub. The arms may be of any desirable number, and they have enlarged heads or outer ends machined on their outer faces to present flat portions, against which the cutting-blades 26 can have a bearing. The flat outer faces of the spiders converge outwardly, so that when the blades are fitted thereto each blade will be substantially spirally disposed. The bearing 6 and the bodies or spiders of the cutters may be of casting or, if desired, steel, this being an immaterial point; but the cutter-blades 26 will be of steel. The hubs of the spiders of the cutters are shown as having squared tapered holes adapted to be driven onto tapered portions at the outer ends of the two shafts 4 in order to non-rotatively hold the cutters to their shafts, the latter at their extreme outer ends being provided with nuts suitably held in place to retain the cutters in position. The cutter-blades can be attached to the machined outer faces of the spider-arms by bolts, rivets, or otherwise. The blades are not attached at their centers to the spiders; but the attachment is near the outer ends of the blades, which, as said blades are wider at such outer ends, properly protects them, avoiding the use of guards, as it is understood that the outer portions of the blades receive the brunt of the work. The fastening means for the blades pass through the wide portion thereof, so as to firmly hold the blades in place and with an ample bearing-surface. The long straight sides of the blades are beveled to form cutting edges.

It will be seen that the bearing 6 extends laterally from the suction-pipe 2, by virtue of which it is adapted to constitute a support for both of the shafts 4.

Having thus described the invention, what I claim is—

1. A dredging apparatus having a suction-pipe, cutters to operate at the inlet end of the suction-pipe, shafts carrying the respective cutters and extending longitudinally of the suction-pipe, and bearings on the suction-pipe, for the shafts, one bearing being located at the inlet end of said pipe and supporting the outer ends of both of said shafts.

2. In a dredging apparatus, a suction-pipe, a cutter to work at the inlet end of the suction-pipe, a shaft to which the cutter is connected and extending longitudinally of the suction-pipe, and bearings on the suction-pipe for said shaft, one bearing being located at said inlet end of said pipe to support the outer end of the shaft, the cutter having blades extending longitudinally of the suction-pipe, and said last-mentioned bearing having a guard for said blades.

3. In a dredging apparatus, a suction-pipe, a cutter to work at the inlet end of the suction-pipe, a shaft to which the cutter is connected and extending longitudinally of the suction-pipe, and bearings on the suction-pipe, for said shaft, one bearing being located at said inlet end of said pipe to support the outer end of the shaft, the cutter having a plurality of blades extending longitudinally of the suction-

pipe and said last-mentioned bearing having a part-annular flange to protect the inner portions of the blades.

4. In a dredging apparatus, a suction-pipe, cutters to work at the inlet end of the suction-pipe, parallel shafts to which the respective cutters are connected and extending longitudinally of the suction-pipe, bearings on the suction-pipe, for said shafts, the outermost bearing being located at the inlet end of and extending laterally from the suction-pipe to support the extreme outer portions of the shafts, and means for oppositely rotating the shafts.

5. In a dredging apparatus, a suction-pipe, cutters to work at the inlet end of the suction-pipe, shafts to which the cutters are connected and extending in parallelism longitudinally of the suction-pipe, means for oppositely rotating the shafts, bearings on the suction-pipe, for said shaft, the outermost bearing being located at said inlet end and serving to support the outermost portions of the shafts, the cutters having blades, and the said last-mentioned bearing having part-annular flanges at opposite sides of the longitudinal axis of the suction-pipe, for protecting the inner portions of said blades.

6. In a dredging apparatus, a cutter comprising a hub provided with arms having enlarged outer ends, the outer faces of which are flat and angular to the axis of motion of the cutter, and flat blades fitted to the said flat faces and provided along one side with a straight cutting edge, the cutter having a widened portion extending from its center to the outer end thereof.

7. In a dredging apparatus, a suction-pipe, cutters to work at the inlet end of the suction-pipe, shafts arranged in parallelism and extending longitudinally of the suction-pipe, the cutters being fixed to said shafts, means for rotating the shafts oppositely, and bearings upon the suction-pipe for supporting the shafts, the outermost bearing having a hole to receive the inlet end of the suction-pipe and being removably fastened to said suction-pipe.

8. In a dredging apparatus, a suction-pipe, a cutter to work at the inlet end of the suction-pipe, a shaft to which the cutter is connected and extending longitudinally of the suction-pipe, and bearings on the suction-pipe for said shaft, one bearing being located at said inlet end of said pipe to support the outer end of the shaft, and the cutter having blades extending longitudinally of the suction-pipe.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

FRED A. JONES.

Witnesses:
ORIS J. VAN PELT,
EDGAR WATKINS,