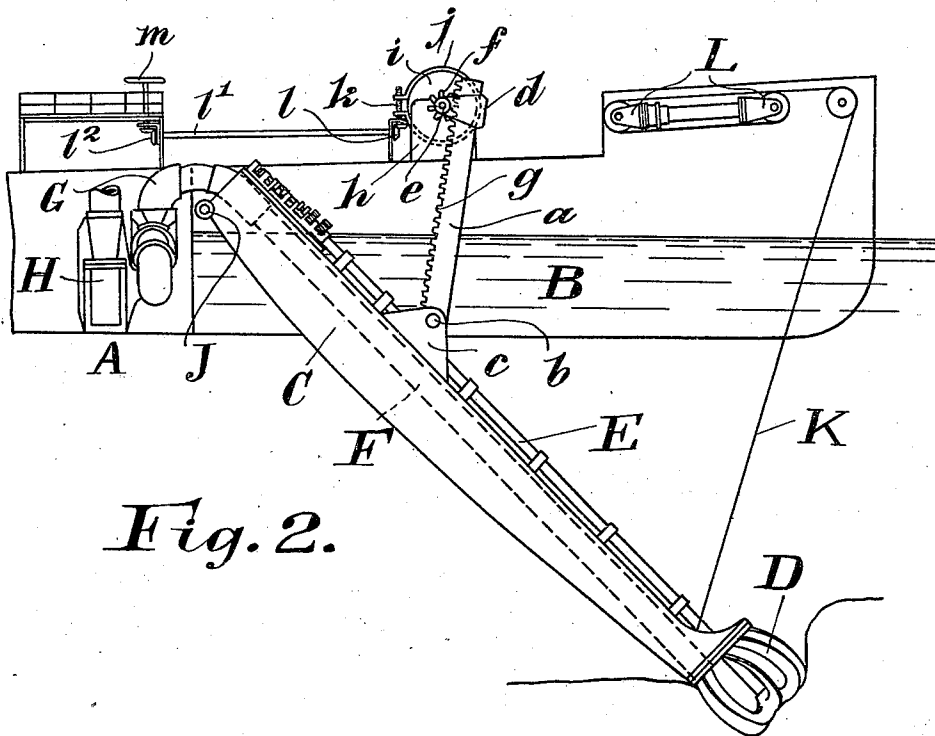
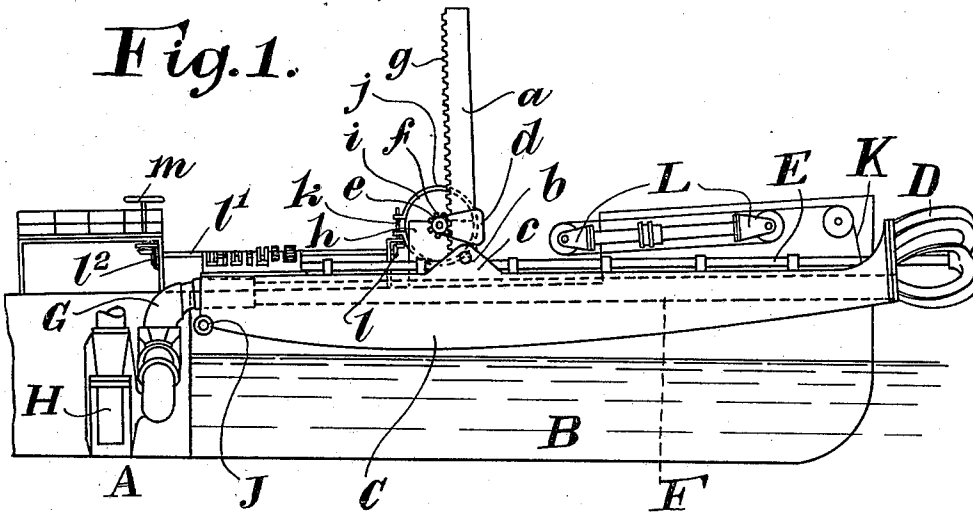


F. LOBNITZ.
SUCTION DREDGER.
APPLICATION FILED JULY 15, 1910.

1,013,669.

Patented Jan. 2, 1912.

3 SHEETS—SHEET 1.



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Patented Jan. 2, 1912.

3 SHEETS—SHEET 2.

Fig. 3.

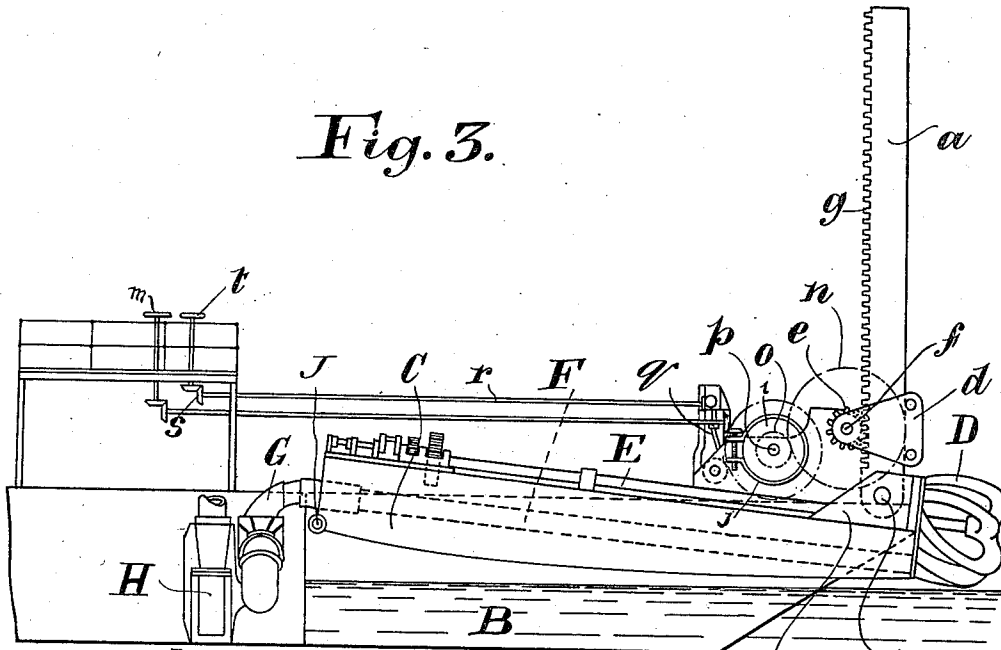
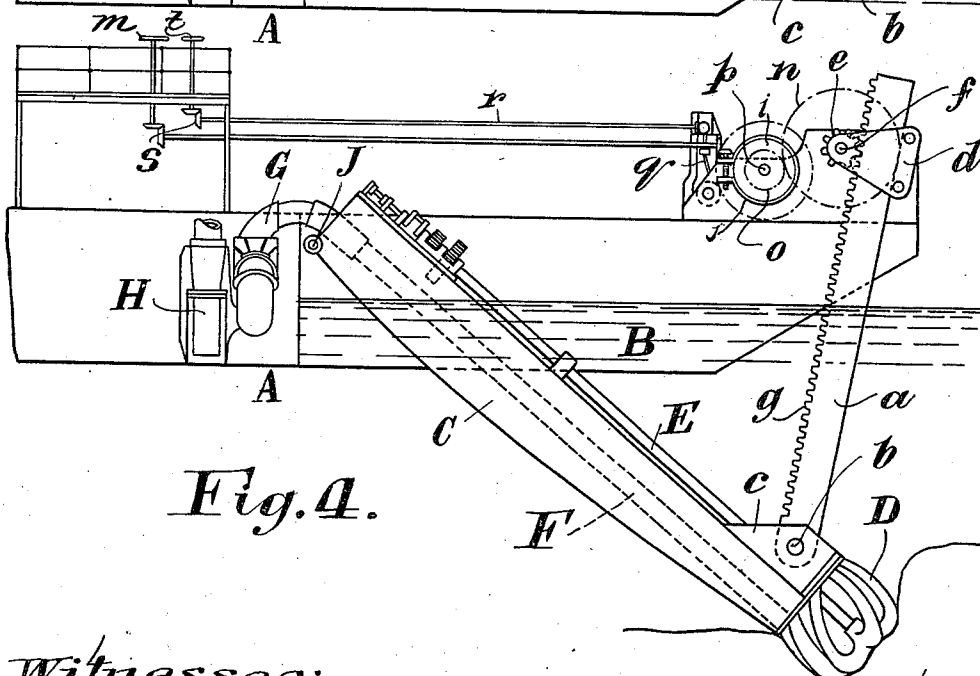


Fig. 4.



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1,013,669.

Patented Jan. 2, 1912.

3 SHEETS-SHEET 3.

Fig. 5.

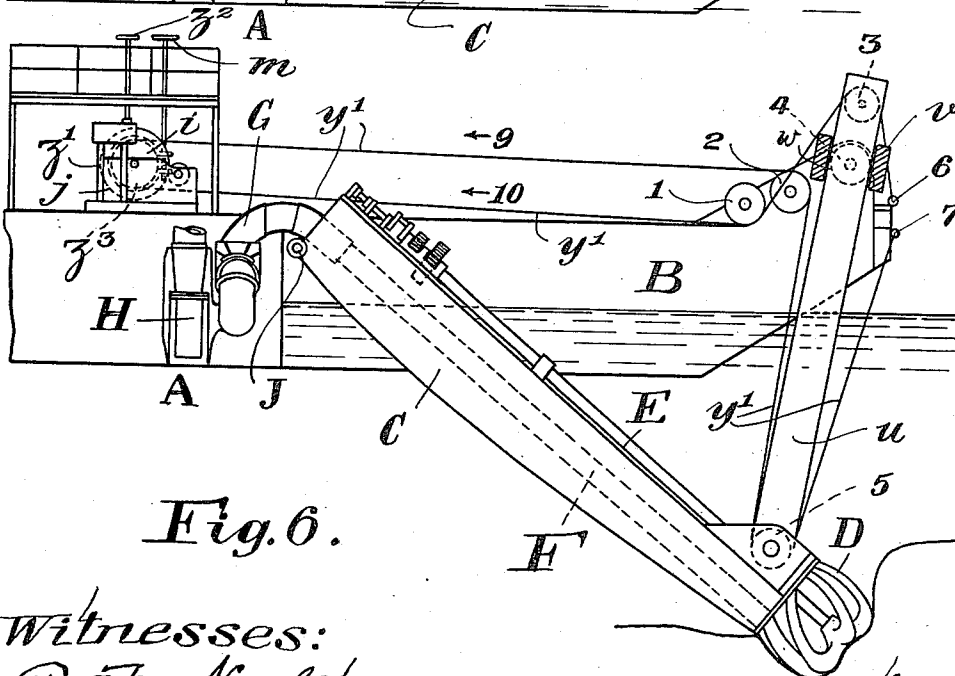
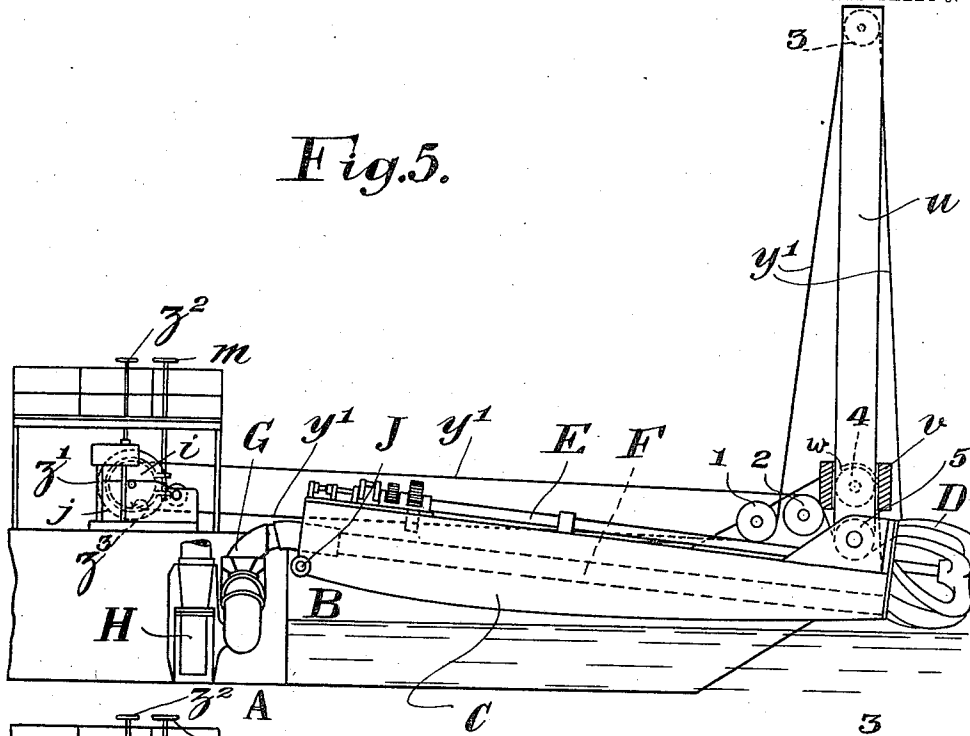


Fig. 6.

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UNITED STATES PATENT OFFICE.

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SUCTION-DREDGER.

1,013,669.

Specification of Letters Patent.

Patented Jan. 2, 1912.

Application filed July 15, 1910. Serial No. 572,062.

To all whom it may concern:

Be it known that I, FRED LOBNITZ, a subject of the King of Great Britain, residing at Crookston, Renfrewshire, Scotland, have invented certain new and useful Improvements in Suction-Dredgers, of which the following is a specification.

This invention relates to that class of suction dredger in which the suction pipe is provided with a rotating cutter. Such cutters are quite successful when soft clay is being dredged and this is due to the fact that the revolving cutter, which is preferably fed sidewise against a face of the material, cuts through the clay easily, but, if the revolving cutter meets hard clay or other hard material, the revolving cutter tends to rise up and slide over the surface of the hard material, consequently, not cutting or effecting only a very thin cut.

Now, the object of my invention is to provide means whereby the cutter can be held down to its work and prevented from rising unless it comes in contact with rock or very hard material when, in such cases, means are provided for allowing the cutter to rise.

A suction dredger of the above class, when provided with my apparatus, can perform a much wider range of work than at present. It can cut and dredge not only sand, soft clay, etc., but also comparatively hard materials such as chalk, hard clay, and the like. At present of course, the cutter is held down to a certain extent by its own weight and that of the ladder which carries it but this is quite insufficient for the purpose and, under my invention, I provide, in conjunction with the ladder carrying the suction pipe and rotary cutter, means for positively holding down the ladder so that the cutter shall be prevented from rising, except when it comes in contact with a very hard obstacle, whereupon the holding means is allowed to yield or slip so as to permit the cutter to over-ride the obstacle.

The invention can be carried out in various ways and I now propose to describe, by way of example, or illustration, several methods which will be fully explained in connection with the drawings annexed hereto and whereon:—

Figure 1 is an outline view of the fore part of a dredger with the ladder and cutter in the raised position. Fig. 2 is a similar view but showing the ladder in the lowered position with the cutter as it appears when

performing its work. Figs. 3 and 4 show another mode of carrying out the invention, the cutter being in the raised position at Fig. 3 and in the lowered position at Fig. 4. Figs. 5 and 6 show a third method of carrying out the invention, the cutter being shown in the raised position at Fig. 5 and in the lowered position at Fig. 6.

On the drawings the rotating cutter shown is the well-known "Robinson" cutter but, of course, any other well-known and suitable rotating cutter can be used, such cutter forming no part of this invention.

Referring to the drawings, whereon the same reference letters, wherever repeated, indicate the same or similar parts:—A is the dredger. B the well of the dredger. C the usual ladder. D the "Robinson" cutter. E the shaft for rotating the cutter. F the suction pipe carried by the ladder and G the junction pipe leading from said suction pipe to the pump H. The shaft E of the cutter is rotated by gearing from a prime mover in any usual manner. The ladder, which is fulcrumed at its upper end, at J, can be raised and lowered by means of a wire rope or ropes K operated by hydraulic rams L or by other usual mechanism in the known manner.

In carrying out my invention I combine with the ladder C carrying the cutter shaft E and rotating cutter D and also the suction pipe F, means for positively holding the cutter to its work, said means, as shown at Figs. 1 and 2, comprising a rack (or racks) *a* which, at its lower end, is pivoted at *b* to the ladder, which latter may be made with side plates or lugs *c*, one at each side, between which the rack is held. The rack, at its upper end, is slidably carried within a guide collar or holder *d* pivotally secured upon the shaft *e* which shaft carries a pinion *f* adapted to engage with the teeth *g* of the rack. On the shaft *e*, which is carried in suitable bearings in the frame (or frames) *h* is a drum (or drums) or wheel (or wheels) *i* around which is passed a brake band, (or bands) *j* capable of being tightened up by means of the screw *k* and gearing *l*, *l*¹, *l*², from a wheel *m* on the bridge, so that the officer in charge can either tighten or slacken the brake band (or bands) upon the drum (or drums) as he desires. With this arrangement, when it is desired to dredge, the ladder C is lowered into position by operating the hydraulic gear L so as

to slacken the line K, and, at the same time, the brake band *j* is loosened from its drum so that the weight of the ladder and the mechanism carried by it will pull down the rack *a* and rotate the drum *i* which latter runs freely. When the ladder has been lowered to the position desired it is positively locked and held in position by tightening the brake band upon the drum whereupon the rack and pinion interlock and prevent any upward movement of the ladder. The adjustable frictional grip of the brake band, however, is so calculated that, should the cutter come in contact with a very hard obstacle, such as a rock, for instance, then, when the upward pressure upon the rack *a* due to the resistance of the obstacle to the cutter, reaches a certain degree, the drum will rotate even though it is held by the band brake, thereby allowing the rack to move upward and thus preventing the cutter being broken by a too great pressure upon it. This upward movement of the rack, when held by the friction brake, I will hereinafter refer to as "slip" and the provision of means for allowing such slip is very essential as will be readily understood. When the ladder is to be raised the brake is slackened on the drum and the rack bar, as the ladder is raised by the rope K, slides through the pivoted holder *d* and finally assumes the position shown at Fig. 1.

The arrangement shown at Figs. 3 and 4 differs slightly from that shown at Figs. 1 and 2 in so far as the rack *a* is pivoted to the end of the ladder, being carried in jaws *c* as before. The pinion *e* in this case is on a shaft *f* which carries a spur wheel *n* gearing with a pinion *o* on a shaft *p* which latter may be driven from a steam engine or prime mover *q*, the steam supply and reversing gear of which can be controlled by means of a valve operated by a shaft *r* and gear *s* from a wheel *t* on the bridge. In this case also, there is provided a drum (or drums) or wheel (or wheels) *i* around which is passed a brake band (or bands) *j* capable of being operated from a wheel *m* as in the arrangement shown at Figs. 1 and 2. In this case it will be seen that the operation of the engine *q* both raises and lowers the rack and with it the ladder, and, when the engine is stopped, the ladder is held in position by means of the rack thus obviating the necessity for using special ladder raising and lowering means. This arrangement can also be utilized, if so desired, to give a positive downward feed in order that the cutter may be caused to cut into hard material.

In the arrangement shown at Figs. 5 and 6 the rack *a* is dispensed with and the ladder is raised and lowered by means of a beam *u*, which is pivotally secured at its lower end to the end of the ladder and is

passed through a guide *v* provided with journals working in a frame *w*. The beam is operated by means of the wire rope *y*¹ which is wound around a drum *z*³ of the winch engine *z*¹ which latter can be controlled from the bridge by a wheel *z*². The rope passes over the pulleys 1, 2, 3, 4 and 5, and is secured, at its ends 6, 7, to the vessel. When the rope is pulled in the direction of the arrow 9 the ladder and beam *u* are raised and when the rope is pulled in the direction of the arrow 10 the beam and ladder are forced downward. The ladder can, of course, be held in any position by simply locking the drum *i* which latter is provided with a friction device as in the arrangements shown at Figs. 1 and 2 and Figs. 3 and 4, for permitting slip.

It will be obvious that the invention can be carried out in other ways but the examples I have shown are sufficient to enable those skilled in the art to readily understand and execute the same.

Having now fully described my invention what I claim and desire to secure by Letters Patent is:—

1. In a suction dredger the combination, with a ladder having a suction pipe or passage, of a rotating cutter carried by said ladder, means for operating the cutter, means for holding the cutter down to its work, and means for allowing said holding means to slip when a certain pressure is exerted thereon.

2. In a suction dredger the combination, with a ladder having a suction pipe or passage, of a rotating cutter carried by said ladder, means for operating the cutter, means for holding the cutter down to its work, a rotary member connected with said holding down means, and means for allowing the rotary member to rotate and the cutter to rise when a certain pressure is exerted thereon.

3. In a suction dredger the combination, with a ladder having a suction pipe or passage, of a rotating cutter carried by said ladder, means for operating the cutter, a holding down member secured to the ladder, means in engagement with said member for holding the cutter down to its work and means for allowing the cutter to rise when a certain pressure is exerted thereon.

4. In a suction dredger the combination, with a ladder having a suction pipe or passage, of a rotating cutter carried by said ladder, means for operating the cutter, means for holding the cutter down to its work and for allowing slip when a certain pressure is exerted thereon, and means for adjusting the holding down means so as to vary the degree of pressure necessary to cause slip.

5. In a suction dredger the combination, with a ladder having a suction pipe or pas-

sage, of a rotating cutter carried by said ladder, means for operating the cutter, a rack pivotally secured to said ladder, a toothed wheel in engagement with the rack, 5 a drum secured to the toothed wheel, a brake band engaging said drum, and means for operating the said band so as to hold the cutter down to its work and to allow the same to slip when a certain pressure is exerted thereon. 10

6. In a suction dredger, the combination with a ladder having a suction pipe or passage, of a rotating cutter, means for operating the cutter, a rack pivoted at one end 15 to the ladder, guide means for the rack, a pinion gearing with the rack and friction means for locking the pinion.

7. In a suction dredger, the combination with a ladder having a suction pipe or passage, of a rotating cutter, means for operating the cutter, a rack pivoted at one end 20 to the ladder, guide means for the rack, a pinion gearing with the rack, a shaft carrying the pinion, a drum on the shaft, a friction brake for the drum and means for applying the brake. 25

8. In a suction dredger, the combination with a ladder having a suction pipe or passage, of a rotating cutter, means for operating the cutter, a rack pivoted at one end 30 to the ladder, guide means for the rack, a pinion gearing with the rack, a shaft carrying the pinion, a drum on the shaft, a friction brake for the drum, and means for applying the brake from the bridge of the 35 dredger.

9. In a suction dredger, the combination with a ladder having a suction pipe or passage, of a rotating cutter, means for operating the cutter, a rack pivotally secured at 40 its lower end to the cutter, a collar pivotally secured to the dredger and through which the rack can slide, a pinion gearing with the rack, a shaft, a drum on the shaft, a brake strap on the drum, and means for 45 tightening or slackening the brake strap.

In testimony whereof I affix my signature in presence of two witnesses.

FRED LOBNITZ.

Witnesses:

JAMES R. WOOD,
GAVIN GREIG.