W. P. OHLHAUSEN.

ROCK SAW.

APPLICATION FILED AUG. 28, 1915.

1,246,990.

Patented Nov. 20, 1917.

2 SHEETS—SHEET 1.

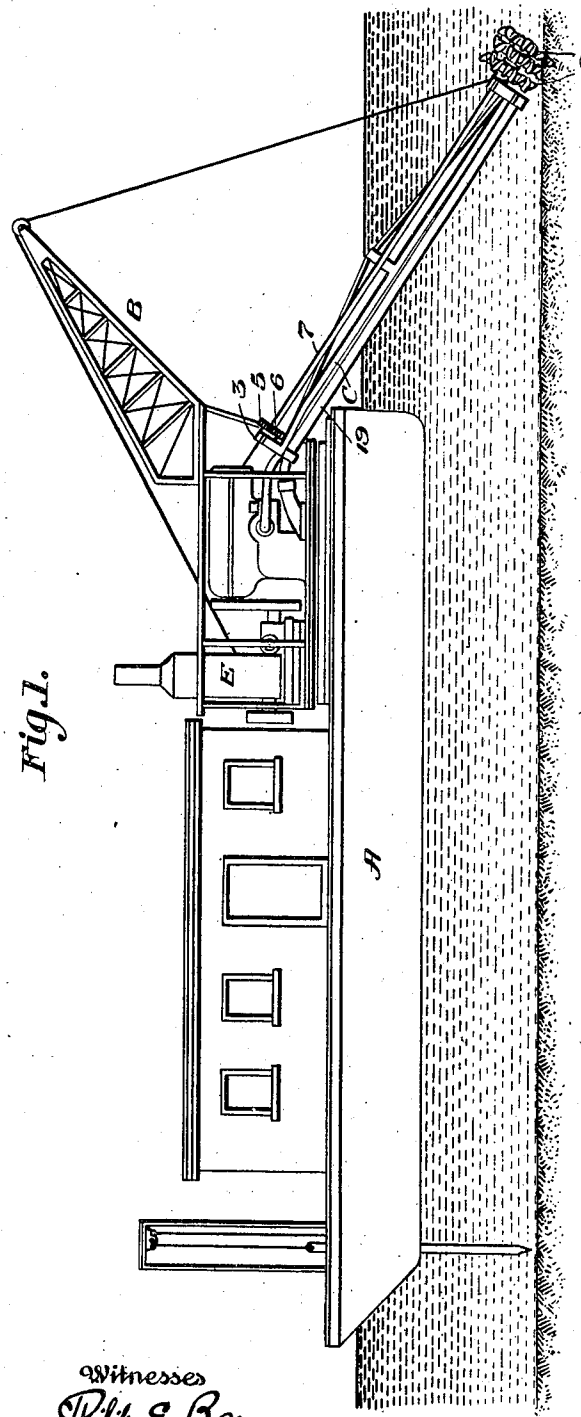


Fig. 1.

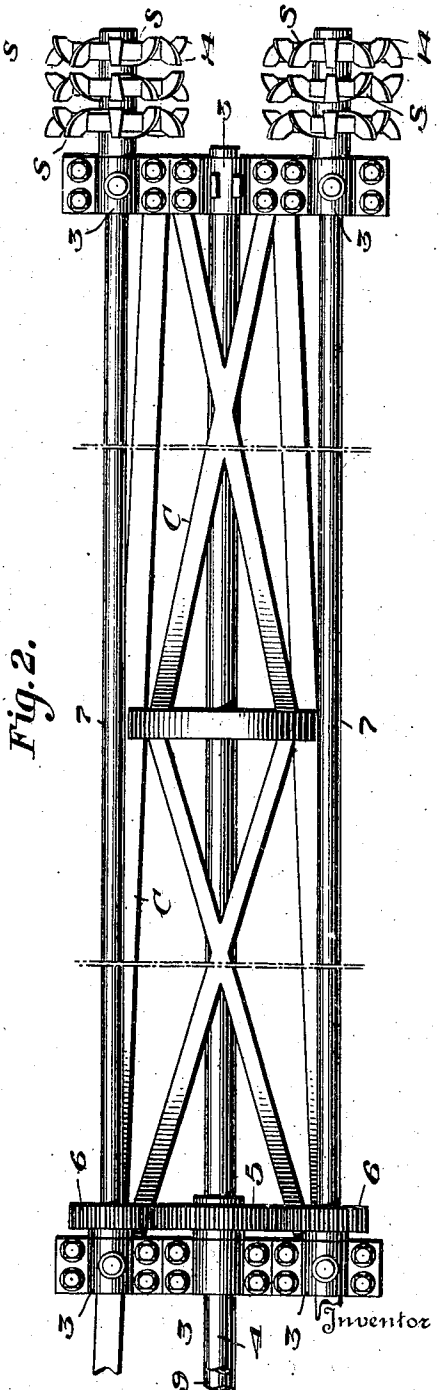


Fig. 2.

Witnesses

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2 SHEETS—SHEET 2.

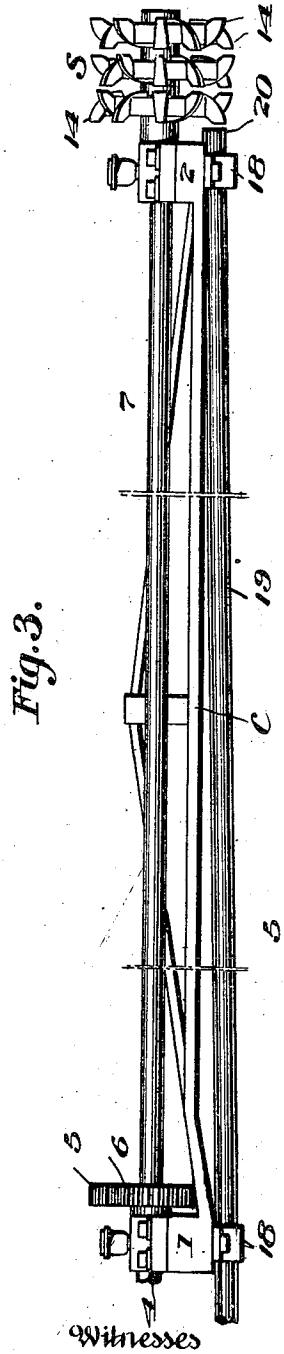


Fig. 3.

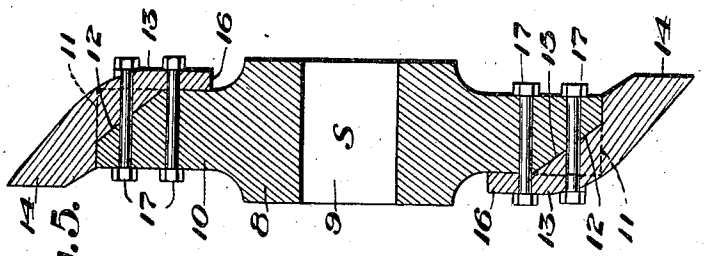


Fig. 5.

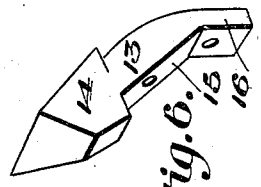


Fig. 6.

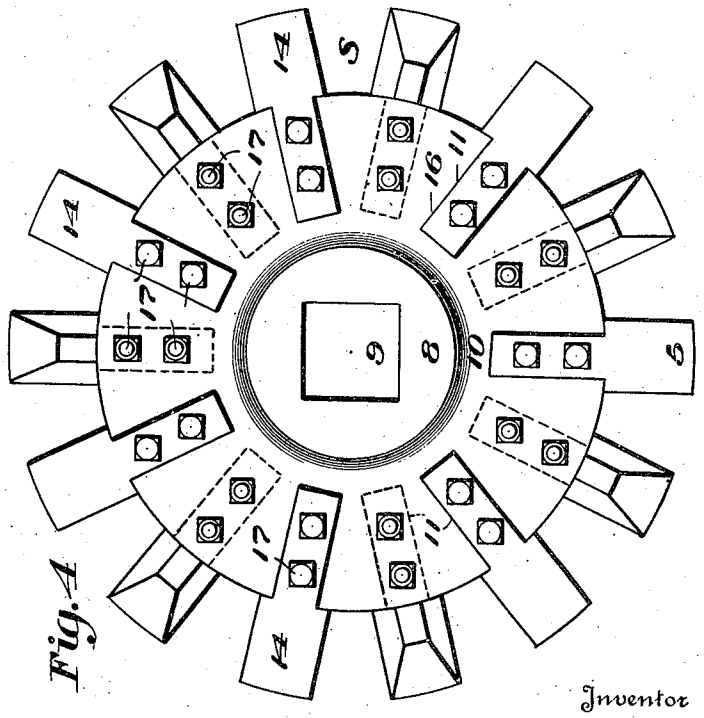


Fig. 4.

Witnesses

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UNITED STATES PATENT OFFICE.

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ROCK-SAW.

1,246,990. Specification of Letters Patent. Patented Nov. 20, 1917.

Application filed August 28, 1915. Serial No. 47,723.

To all whom it may concern:

Be it known that I, WILLIAM P. OHLHAUSEN, a citizen of the United States, residing at Jacksonville, in the county of Duval and State of Florida, have invented new and useful Improvements in Rock-Saws, of which the following is a specification.

This invention relates to certain novel and useful improvements in a machine for sawing or cutting rock and other relatively hard material.

In the present instance I have shown my invention as employed in connection with a hydraulic dredge, under which conditions it may be used in sawing, cutting and digging the relatively hard rock-like bed of a body of water. However, I wish it to be understood that this is merely by way of illustration, as the invention may be employed under any circumstances wherein its use may be found desirable and advantageous, such, for instance, as in road work, mining and the like.

Where I have hereinafter used the term "rock," I wish it to be understood that this is intended to include other relatively hard material, such as coal, salt, sand, stone, hard earth and other similar solid substances.

In carrying out my invention, I propose to provide a machine of this character wherein the rock or like material may be rapidly, easily and conveniently cut or sawed, with a minimum expenditure of time and labor.

It is also my purpose to provide a machine of this type embracing one or more rotary saws or cutters, each of which is of such novel and peculiar construction and arrangement as to enable it to perform its cutting function, irrespective of whether it be running forwardly or backwardly. Furthermore, where the cutters are in supported relation with a laterally swinging part, such for instance, as the ladder frame of a hydraulic dredge, as shown herein, they will operate to cut or saw with equal facility and efficiency at either side of the apparatus.

Another purpose of the invention is to so mount the teeth of each saw or cutter upon the head or disk thereof as to reduce the liability of such teeth being broken or otherwise injured under the rough usage to which they are subjected in the process of working, while at the same time, if necessary, these teeth, which are self-sharpening, as hereinafter explained, may be easily and readily removed, and replaced.

With the above recited objects and others of a similar nature in view, my invention consists in the construction, combination and arrangement of parts set forth in and falling within the scope of the appended claims.

In the accompanying drawings:

Figure 1 is a view in side elevation of a conventional form of hydraulic dredge equipped with my invention.

Fig. 2 is a top plan view of the frame and the sawing or cutting devices carried thereby.

Fig. 3 is a side view thereof.

Fig. 4 is an enlarged detail view in elevation of one of the circular saws or cutters.

Fig. 5 is a cross sectional view taken on the line 5—5 of Fig. 4.

Fig. 6 is a detail perspective view of one of the sawing or cutting teeth.

Before entering into a detail description of my invention, I will briefly state that in the preferred form shown herein, it embraces among other features, a drive shaft, having mounted thereon, usually adjacent its forward end, a plurality of preferably circular disks or heads, suitably spaced apart, and each carrying a plurality of peripherally arranged cutting teeth, the teeth of each disk or head being arranged in oppositely disposed and staggered relation, so that the saws may cut or work either forwardly or rearwardly. Furthermore, when employed in supported relation with a laterally swinging member, such as the ladder frame of a hydraulic dredging apparatus, such as conventionally illustrated herein, the saws or cutters will work either to starboard or port, or to one side or the other of the apparatus.

Referring now to the accompanying drawings in detail, the letter A indicates conventionally a hydraulic dredge, while B is the swinging boom thereof and C indicates the elongated ladder-like frame. This frame includes the usual tail block 1 at one end and the head block 2 at the opposite end. These blocks 1 and 2 are provided in the present instance with centrally arranged bearings 3 for the drive shaft 4. This drive shaft has fast therewith adjacent the tail block, a gear 5, meshing with the gear pinions 6 carried by the cutter shafts 7. In the present instance I have shown a pair of spaced, substantially parallel cutter shafts 7, and

each at its outer end or beyond the head block 2, carries a plurality of circular saws or cutters, each of which is indicated as an entirety by the letter S. I have shown three saws or cutters arranged upon each shaft 7, but it will, of course, be understood that any suitable and desired number of saws or cutters may be employed. Referring particularly to Figs. 4 and 5, it will be seen that each cutter S includes a hub section 8, preferably having a tapered square bore 9. The circular flange section 10 of each disk or head is formed with a series of spaced slots 11, the bottom wall of each slot being inclined or beveled, as shown at 12. Each of these slots is adapted to receive the shank 13 of a tooth 14, this shank being beveled on one face, as at 15, to fit against the inclined or beveled bottom wall of the slot, while the tail 16 of the shank is adapted to bear against the adjacent face of the flange of the disk or head, as clearly shown in Figs. 4 and 5. Suitable fastening means, such as the bolts 17, pass through the shank of each tooth and through the flange of the disk or head, and thus secure the tooth in working position. By this arrangement the strain on the tooth will be taken up by the disk or head, while the tooth will not project beyond the periphery of the spider far enough to render it liable to be easily broken. However, in case a tooth should break, it may be readily removed and another substituted therefor. Furthermore, the cutting sections of the teeth are so formed as to be self-sharpening as they wear down under working conditions. The cutting edges of the set of teeth on one side of the head are positioned oppositely to the cutting edges of the other set of teeth, so that as the cutter is advanced the cutting edges of one set bite into the earth and the back surfaces of the other set are ground or worn down by contact with the earth and a sharp cutting edge is thus maintained on the teeth. As the cutter is moved rearwardly, the second set of teeth bite into the ground and the first set are sharpened.

It will be noted, especially by reference to Figs. 3, 4 and 5, that the teeth of each cutter disk or head are arranged in staggered relation and are positioned oppositely relative to each other. By this arrangement the cutting or sawing will take place irrespective of whether the head be operated forwardly or rearwardly.

The head and tail blocks of the ladder frame C, in addition to forming a support for the drive shaft and the cutter shafts, are also provided, in the present instance, with suitable hanger bearings 18 secured to the under faces thereof, and which bearings 18 carry, in the present instance, the suction pipe 19, the mouth of which terminates adjacent the saws or cutters, as shown at 20. This suction pipe, of course, operates as usual to remove earth and silt and the cuttings and debris resulting from the sawing or cutting process.

The single drive shaft 4 which drives the cutters or saws, may be in turn driven from any suitable engine or motor, such as from the engine E, shown in Fig. 1, any suitable power transmission devices being employed to transmit the power from the engine to the drive shaft 4. Furthermore, I wish it to be understood that the cutter disks or heads may be fastened on the cutter shafts in any suitable manner, for instance, the walls of the hub bores may be tapered in the well known manner, and the portions of the shafts extending through these bores may also be correspondingly tapered to make a snug, secure tight fit, with the last cutter head on each shaft secured against displacement through the medium of a pin, key, or other device.

In the arrangement shown in Fig. 1, the ladder frame is, of course, designed to swing from side to side, or from starboard to port, as is usual in devices of this class, and consequently the saws or cutters may be correspondingly shifted, and as herein stated, the saws or cutters will perform the cutting operation at either side of the apparatus.

From the above description, taken in connection with the accompanying drawings, the construction and operation of my invention will be readily apparent to those skilled in the art. It will be noted that when the power is applied to the single drive shaft, both of the cutter shafts will be rotated to correspondingly rotate the circular saws or cutters carried thereby, these in turn cutting, digging and sawing the material upon which they are working. In the sawing or cutting operation, the material is rapidly, quickly and thoroughly sawed, cut or broken up into fine sand-like particles, so that it may be readily removed by means of a suction pipe, or through any other agency.

While I have herein shown and described one particular embodiment of my invention, I wish it to be understood that I do not confine myself to all the precise details of construction herein set forth by way of illustration, as modification and variation may be made without departing from the spirit of the invention or exceeding the scope of the appended claims.

What I claim is:

1. A cutter comprising a head having slots in each of its peripheral edges, a set of teeth in the slots on one side of the head having their cutting edges disposed toward the opposite side of the head, and a second set of teeth in the slots on the other side of the head having their cutting edges disposed toward the opposite side of the head.

2. In a machine of the class described, a

substantially circular cutter head having a series of radial slots opening through the periphery of the head, cutting teeth socketed in said slots and disposed in oppcsing and staggered relation, and means for rotating the head.

3. In a machine of the class described, a substantially circular cutting head having a series of spaced slots opening through the periphery of the head, the bottom wall of each slot being beveled, and a tooth adapted to be socketed in each slot, said tooth having an inclined shank section adapted to bear against the beveled bottom wall of the slot and a cutting point extending beyond the periphery of the head, and means for rotating the head.

4. A cutter comprising a cutter-head having a series of spaced slots opening through the periphery of the head, the bottom wall of each slot being beveled, and a tooth adapted to be socketed in each slot, said tooth having an inclined shank section adapted to bear against the beveled bottom wall of the slot, and a cutting point extending beyond the periphery of the head.

5. A cutter comprising a head and cutting teeth formed in staggered relation upon the head the teeth attached to one side of the head having their cutting edges beyond the other side of said head, and vice versa.

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

WILLIAM PUJO OHLHAUSEN.

Witnesses:

ROBERT B. CLARK,

WILLIAM M. SANDBERG.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."