June 10, 1930. O. B. PERRY 1,762,794

DREDGING MACHINE

Filed Nov. 7, 1928 3 Sheets-Sheet 1

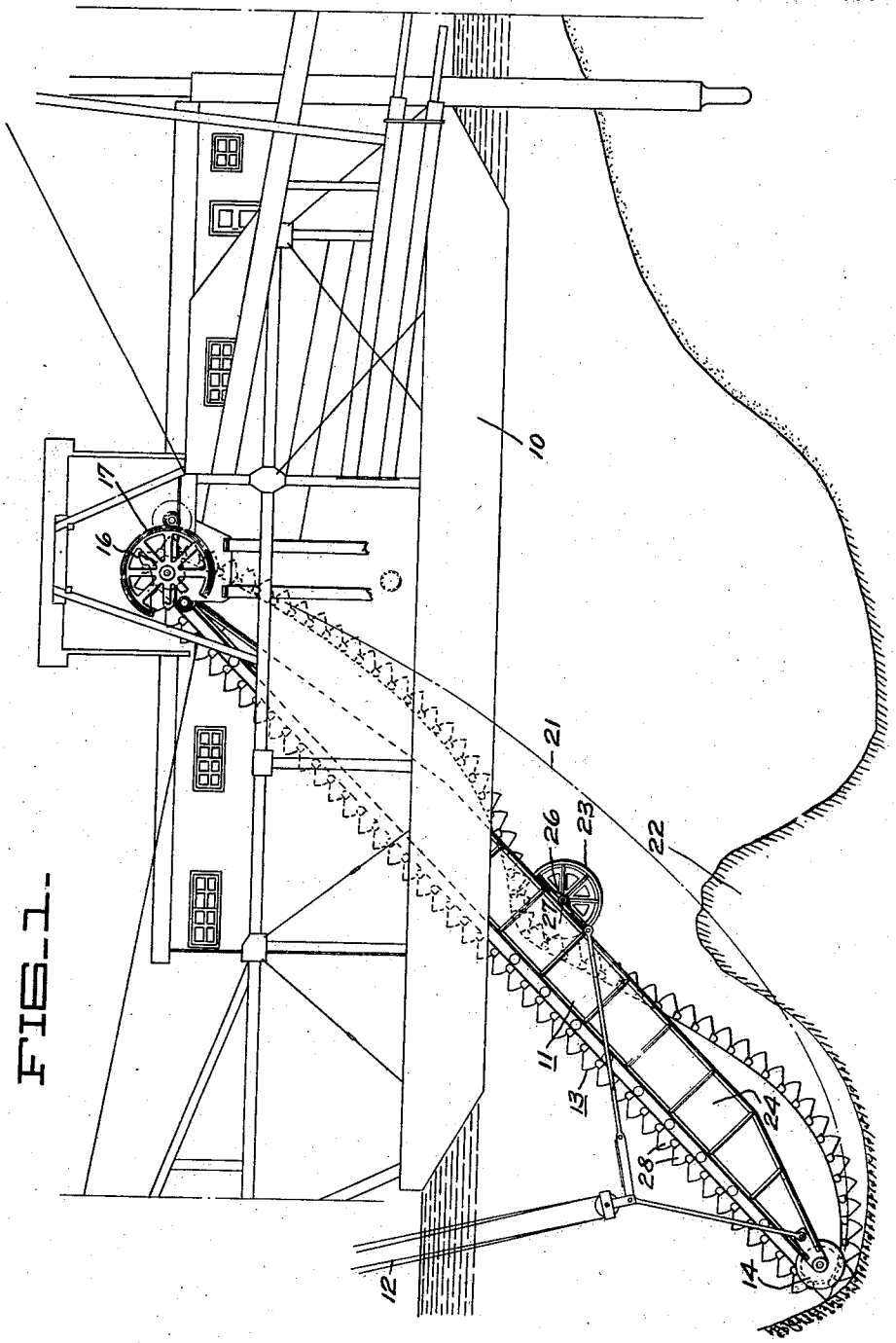


FIG. 1.

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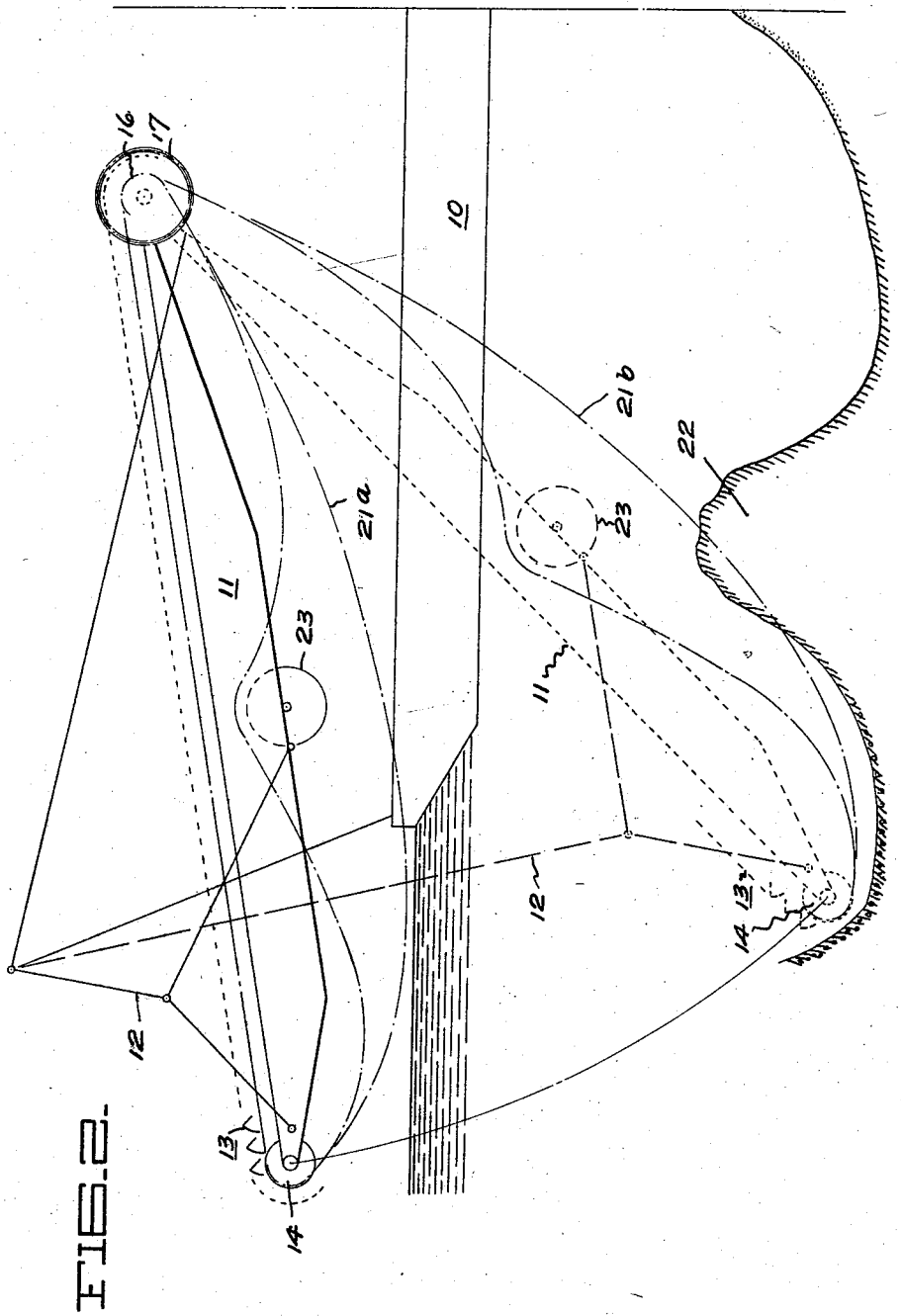


FIG. 2.

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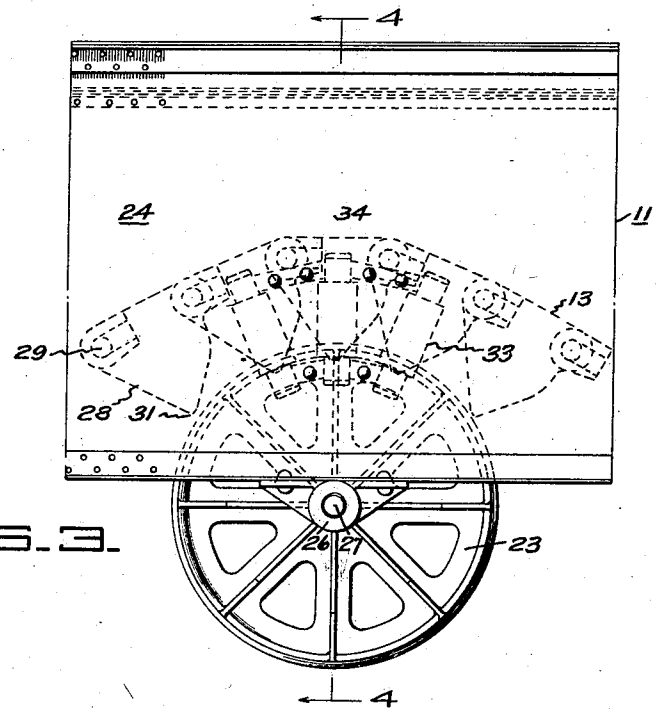


FIG. 3.

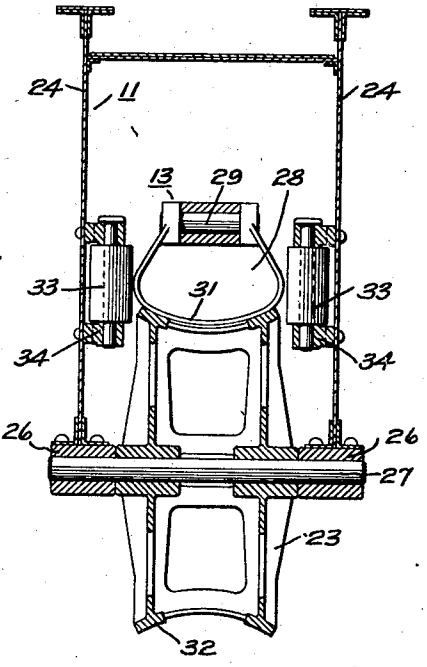


FIG. 4.

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Patented June 10, 1930 1,762,794

UNITED STATES PATENT OFFICE

OSCAR B. PERRY, OF SAN FRANCISCO, CALIFORNIA

DREDGING MACHINE

Application filed November 7, 1928. Serial No. 317,758.

This invention relates generally to the construction of dredging machines, particularly to machines of this character which are employed for the dredging of minerals such as gold or tin.

The usual form of dredging machine of the type to which this invention relates utilizes a suitable supporting structure, such as a barge, to which is adjustably secured an extended ladder carrying a digging bucket line. The ladder is frequently comparatively long and extends downwardly at an angle to the surface of the formation being dredged. The bucket line, which consists of a series of digging buckets linked together, is entrained over an idler tumbler at the lower end of the ladder, and over a driving tumbler at the upper end. The slack portion of the bucket line in ordinary dredgers is substantially unsupported except for idlers which may be mounted upon the barge near the upper end of the ladder. As a result considerable strain and wear is imposed upon the interconnecting links and pins of the buckets and if the ladder is of great length these strains may become excessive or even prohibitive. It is therefore one object of this invention to substantially relieve such strains by supporting the slack side of the bucket line in a novel manner, and at the same time to make practical longer ladders for digging at greater depths.

In dredging over uneven bed rock characterized by sharp pinnacles, such as encountered in Malaya, it is difficult to properly remove the valuable mineral from between the pinnacles with ordinary dredgers as the slack portion of the bucket line tends to loop over and catch upon the pinnacles. It is therefore a further object of this invention to support the slack portion of the bucket line in such a manner that dredging of this character is facilitated.

It is another object of this invention to devise a novel arrangement of an idler wheel for supporting the slack side of a dredging bucket line, and to devise novel means for properly guiding the bucket line upon the idler.

Further objects of the invention will appear from the following description in which I have set forth the preferred embodiment of my invention. It is to be understood that the appended claims are to be accorded a range of equivalents consistent with the state of the prior art.

Referring to the drawing:

Figure 1 is a side elevational view showing a machine incorporating my invention, and illustrating the manner in which it operates upon a formation being dredged.

Fig. 2 is a diagrammatic side elevational view illustrating the bucket line of a dredger supported in accordance with this invention, the ladder being shown in two positions.

Fig. 3 is a detail illustrating in side elevation the idler pulley which I incorporate with my supporting ladder.

Fig. 4 is a cross sectional view taken along the line 4—4 of Fig. 3.

In my invention I utilize an idler wheel which is journaled directly to the ladder of a dredging machine at a point substantially midway between the ends of the same. Preferably the ladder is made of a pair of structural members and the idler wheel is mounted so as to be positioned between such members. Guide rollers are cooperatively associated with the idler wheel, and the slack portion of the bucket line is entrained over this wheel and guided in place by suitable rollers. Thus referring to the drawing I have shown a dredging machine utilizing a supporting barge 10 upon which is mounted an extended ladder 11. By means of a cable 12, the ladder can be raised or lowered to any depth desired. Carried by the ladder, there is an endless bucket line 13 which is entrained about a tumbler 14 journaled to the lower end of ladder 11, and also about a driving tumbler 16 journaled near the upper end of the ladder. Tumbler 16 is driven in any suitable way as by means of driving gears 17, so as to tension the upper portion of the bucket line.

When the lower portion or slack side of such a bucket line is unsupported, except possibly by an idler mounted upon the barge 10 near the driving tumbler 16, the lower

portion of the bucket line sags down along a catenary curve, such as indicated at 21ª in Fig. 2. When the ladder is in a lowered position as during digging operations, the slack side still sags down considerably as indicated by line 21ᵇ. Since the buckets of these lines are comparatively heavy, it is apparent that the weight of the slack portion of the line adds greatly to the strain and wear upon the interconnecting links and pins of the buckets, thus causing frequent breakage and repairs. Furthermore such strains increase enormously with an increase in the length of a dredging ladder, thus imposing a practical limit to the depth of operation. Furthermore when it is attempted to operate the machine over uneven bedrock characterized by one or more pinnacles 22, it is obvious that if the lower end of the ladder is moved close to a pinnacle in order to remove valuable minerals, the sag of the line may permit the buckets to droop over the top of the pinnacle, thus causing the buckets to catch upon the rock formation.

As has been previously outlined, in my invention I provide an idler wheel 23 which is journaled to the ladder 11 and is preferably positioned substantially midway between the ends thereof. The construction of this idler wheel and its cooperative guide rollers is shown more clearly in Figs. 3 and 4. I prefer to construct the ladder 11 of two spaced parallel structural members 24, which are secured together in any suitable manner to form a unitary structure. Bearings 26 are mounted upon the lower edges of structural members 24 to provide a journal for the shaft 27 of the idler wheel 23. The bucket line which I employ utilizes metal buckets 28 linked together by means of pins 29, and the digging edges 31 of the buckets are preferably curved as shown in Fig 3. The lower portion of the bucket line is extended into the ladder between the structural members 24 and is looped over or entrained upon the periphery of idler wheel 23. In order to form a more effective engagement and to guide the bucket line upon the idler wheel, the periphery 32 of the idler wheel is preferably concave to fit the curved digging edges 31 as shown in Fig. 4.

In addition to the idler wheel 23 I also preferably provide guiding means in the form of rollers 33 which are preferably mounted upon the inner sides of structural members 24 by means of suitable bearing blocks 34. Guide rollers 33 are positioned adjacent to the idler wheel 23 and upon both sides thereof, so as to engage the edges of the bucket line and thus retain and guide the line upon the periphery of the idler wheel.

With the slack portion of the bucket line suspended by the idler wheel 23 as shown in Figs 1 and 2, the bucket line sags along two catenary curves, and the descending buckets are kept relatively close to the ladder. A large portion of the weight of the buckets in the slack portion of the line is carried by the idler wheel 23 and thus a substantial amount of strain is removed from the connecting links and pins of the buckets. Therefore with my invention it is practical to construct dredging machines for operating at greater depths than has previously been considered feasible. Furthermore the lower end of the ladder can be brought comparatively close to the base of pinnacle 22 without danger of the bucket line becoming caught as might be the case if the slack portion were unsupported. The number of buckets dragging upon the formation is also materially reduced with the result that the power required to operate my dredging machine is substantially less than with ordinary machines.

I claim:

1. In a dredging machine, a ladder adapted to extend outwardly and downwardly from a supporting structure, an endless bucket line supported by and entrained about said ladder, the upper portion of said line being normally tensioned during operation, and the lower portion being normally slack, an idler wheel journaled upon said ladder and positioned intermediate between the ends thereof, the slack side of said line being entrained over said wheel so that the outer side of the line rides upon the periphery of the wheel, and guide rollers supported by said ladder adjacent said wheel and serving as means for guiding the line upon said wheel.

2. In a dredging machine, a ladder adapted to extend outwardly and downwardly from a supporting structure, an endless bucket line supported by and entrained about said ladder, the upper portion of said line being normally tensioned during operation, and the lower portion thereof being normally slack, an idler wheel journaled upon said ladder and positioned intermediate the ends thereof, the slack portion of said line being entrained over said idler wheel so that the outer side of the line engages the periphery of the wheel, and guide rollers supported by said ladder adjacent said wheel and serving as means for guiding the line upon said wheel, said guide rollers being journaled upon axes arranged at an angle to the axes of rotation of the pulley.

3. In a dredging machine, a ladder adapted to extend outwardly and downwardly from a supporting structure, said ladder being formed of a pair of parallel structural members secured together in spaced relationship, an idler tumbler journaled to the lower end of said ladder, driving tumbler journaled at the upper end of the

ladder, an endless bucket line entrained about said tumblers and arranged to have a slack lower portion, an idler wheel positioned between said structural members and journaled to the ladder substantially midway between the ends thereof, the lower portion of the line being entrained over said wheel, and guide rollers mounted upon the inner side of said structural members and adapted to engage the edges of said bucket line near said idler wheel, said rollers being journaled on axes arranged at right angles to the axis of rotation of said idler wheel.

4. In a dredging machine, a ladder adapted to extend outwardly and downwardly from a supporting structure, an endless bucket line supported by and entrained about said ladder, the upper portion of said line being normally tensioned during operation, and the lower portion being normally slack, means on said ladder intermediate the ends thereof for supporting said line, and means cooperating with said supporting means for guiding the line passing over said support means.

5. In a dredging machine, a ladder adapted to extend outwardly and downwardly from a supporting structure, an endless bucket line supported by and entrained about said ladder, the upper portion of said line being normally tensioned during operation, and the lower portion being normally slack, an idler wheel journaled upon said ladder and positioned intermediate between the ends thereof, the slack side of said line being entrained over said wheel so that the outer side of the line rides upon the periphery of the wheel, and guide means cooperatively positioned with respect to said wheel for guiding the line upon the wheel.

In testimony whereof, I have hereunto set my hand.

OSCAR B. PERRY.