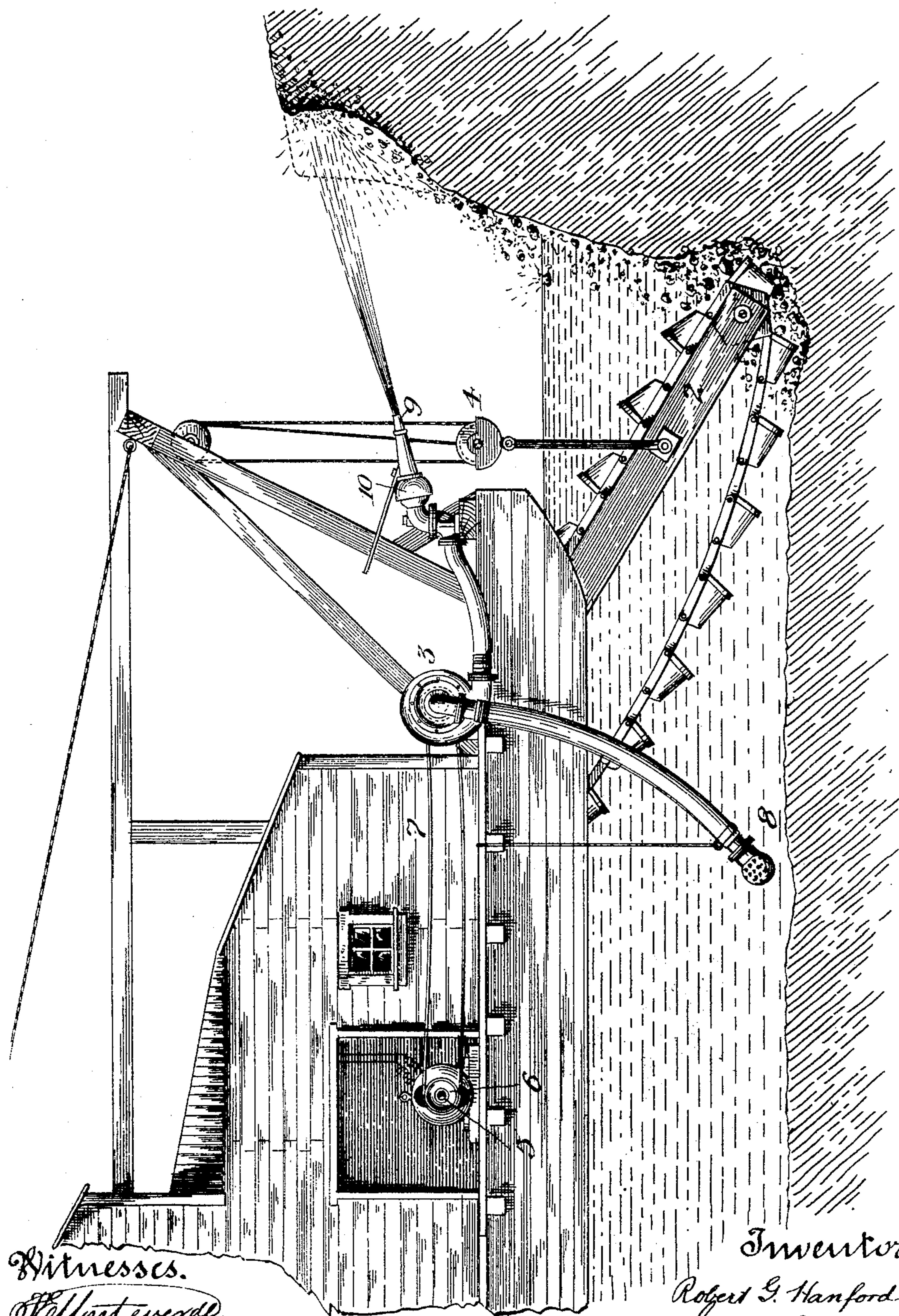


No. 803,587.

PATENTED NOV. 7, 1905.

R. G. HANFORD.  
DREDGING APPARATUS.  
APPLICATION FILED JAN. 19, 1904.



Witnesses.

*H. J. Antevord.*

*M. R. Seely.*

Inventor.

*Robert G. Hanford.*

*by Spear & Seely Attys*

# UNITED STATES PATENT OFFICE.

ROBERT G. HANFORD, OF SAN FRANCISCO, CALIFORNIA.

## DREDGING APPARATUS.

No. 803,587.

Specification of Letters Patent.

Patented Nov. 7, 1905.

Application filed January 19, 1904. Serial No. 189,704.

*To all whom it may concern:*

Be it known that I, ROBERT G. HANFORD, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Dredging Apparatus, of which the following is a specification.

Where floating dredges of a continuous bucket-chain or link-bucket type are used in dredging bodies of auriferous gravel in present river-beds or ancient river-channels it is frequently necessary to approach the gravel-bank in such a manner that in dredging, for instance, a fifty-foot bank there may perhaps be twenty or twenty-five feet of gravel standing above the level of the water on which the dredge floats. By the present method the buckets must dig into the bank to bed-rock at such an angle that the bank may break down above the water-level. The gravel-bank is frequently so set or cemented together that when the cave of the bank comes a great rush of gravel crowds down upon the digging-ladder, interfering with the work and making it necessary for the dredge to back out and begin a new approach into the gravel, causing much delay in time and very often serious breakages in the dredge machinery. At the same time when the undercut is being dug by the buckets the buckets are not well filled by the gravel, making a loss in the capacity of gravel dug per day. By the use of my invention that portion of the gravel situated above the water-line is broken down evenly and may be fed into or near the buckets in such quantity as the operator may desire, the moving buckets either picking up the gravel as it washes down or being washed full of the moving gravel off the top. This enables the dredge-buckets to practically work the entire time with full buckets, when otherwise for a considerable portion of the time they are traveling only partially filled. In addition to the added capacity the use of my invention reduces the strain on the buckets and dredge and enables the operation of the dredge to be much more steady and uniform and at less cost per yard.

The object of my invention is to enable the

dredge to operate more continuously, thereby increasing the dredge's capacity very materially and reducing the operating expense, at the same time decreasing in a very large degree the first cost of the dredge. It enables the buckets to travel practically full during all the period when the dredge is operating and to work with very much less of a strain, working ground of a depth that heretofore has been impossible to dredge. I accomplish this object by a system of dredging apparatus carried by the hull of the dredge and comprising a downwardly-projecting chain of buckets, which operates below the hull and water-level, a pump, and a hydraulic monitor, to which water is delivered under pressure by said pump and adapted to force a powerful stream of water against the bank. The bank is thereby washed down into and near the buckets, enabling the dredge to operate at its full capacity.

I have illustrated my invention in the accompanying drawing, in which is shown a side elevation of the dredge with its auxiliary apparatus in position for enabling the dredge to operate in the above-specified manner.

The dredge is of the usual endless-chain-bucket type, and I do not describe the same in detail, as its construction and operation are well known. However, I have shown at 1 the hull of such a dredger, at 2 the ladder and chain of buckets and also the suspension-cables and main sheave 4, by which the chain of buckets is adjusted. I have shown a driving-shaft 5, having a pulley 6, by means of which power can be applied to the pump 3 by a belt 7. The driving-shaft can be connected to or form a part of any suitable motor or engine or driving apparatus located upon the hull. The suction-inlet 8 of the pump drops into the water in which the dredge floats, as shown. When the pump is put into operation, it forces a stream of water at high pressure into the monitor 9, universally adjustable by the ball-joint 10, and as the monitor is so adjustable a stream can be directed against any part of the bank, so as to wash material down into the bucket or within its range of operation.

Having described my invention, what I

claim as new, and desire to secure by Letters Patent, is—

1. In combination with a floating dredge-hull, a chain of buckets carried thereby and  
5 projecting below the dredge-hull, a pump, and a hydraulic monitor upon the hull, substantially as, and for the purposes set forth.

2. In combination with a dredge-hull, a  
10 pump, and a hydraulic monitor mounted

upon said hull and connected to said pump, and adjustable relatively to said hull, substantially as and for the purposes set forth.

In testimony whereof I have affixed my signature, in presence of two witnesses, this 15  
3d day of December, 1903.

ROBERT G. HANFORD.

Witnesses:

L. W. SEELY,

M. R. SEELY.