

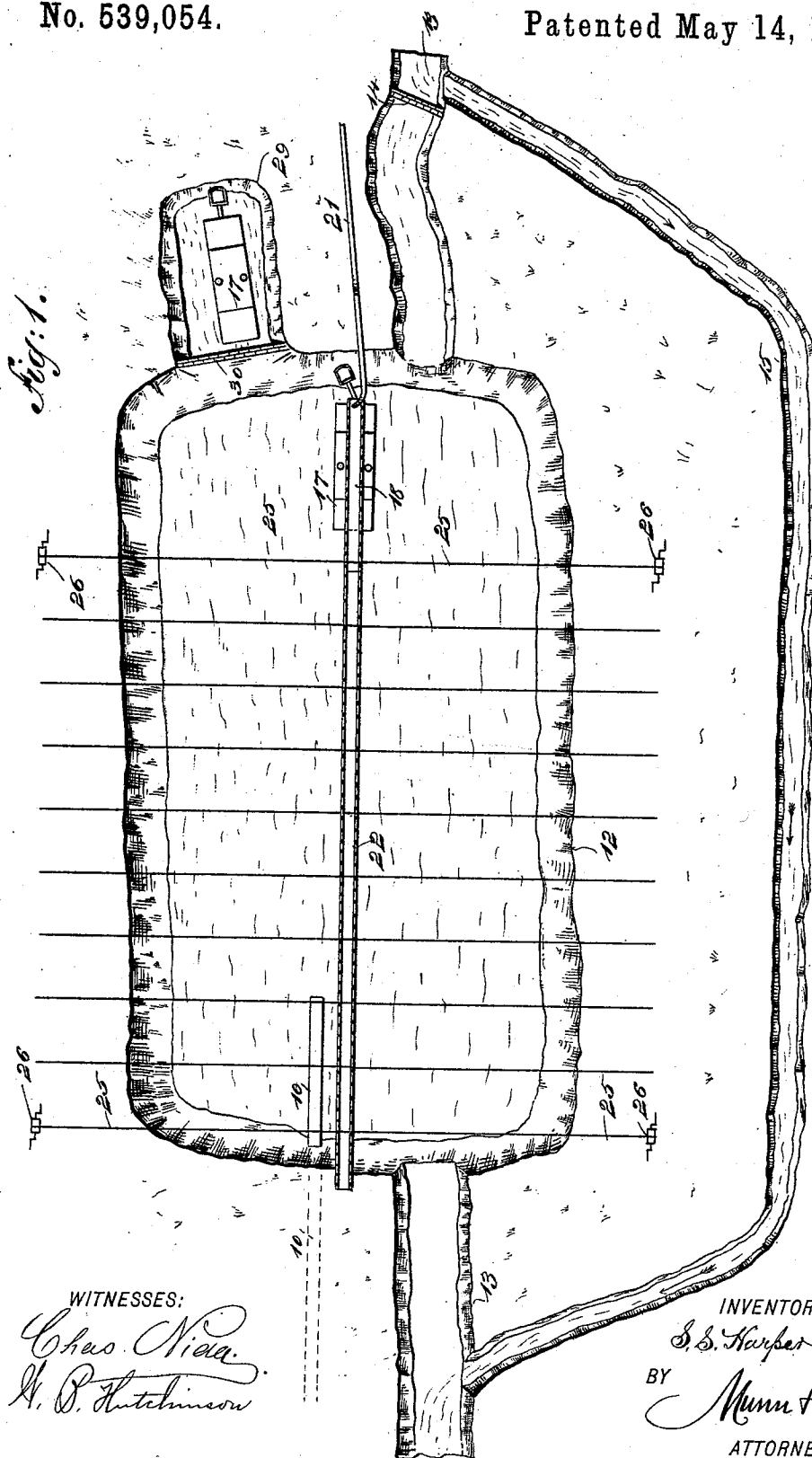
(No Model.)

S. S. HARPER,
PLACER MINING.

3 Sheets—Sheet 1.

No. 539,054.

Patented May 14, 1895.



(No Model.)

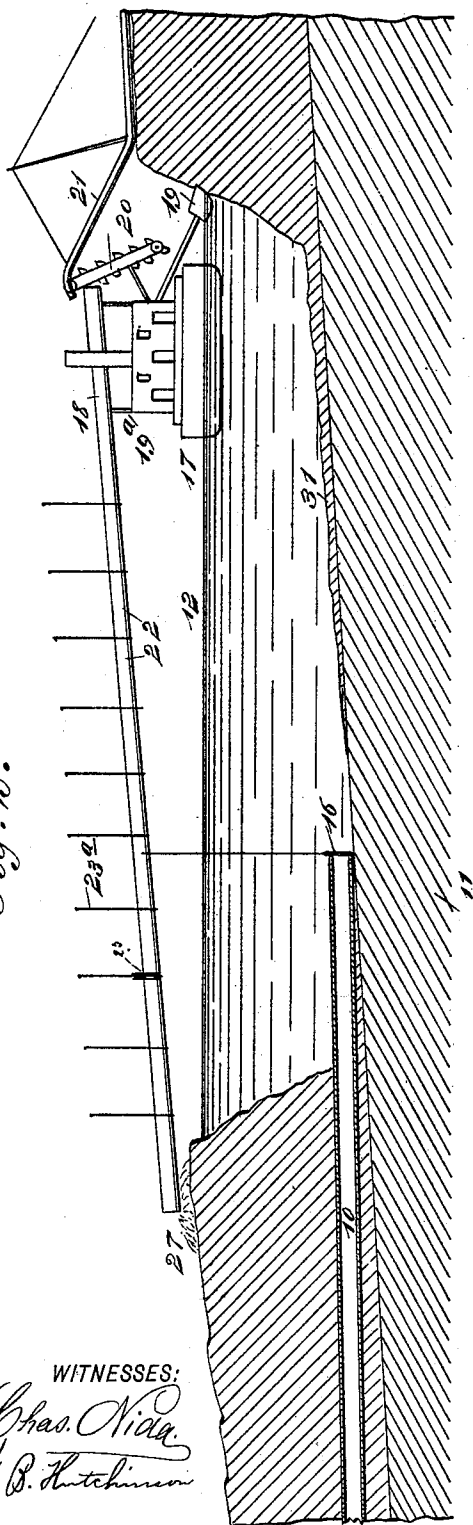
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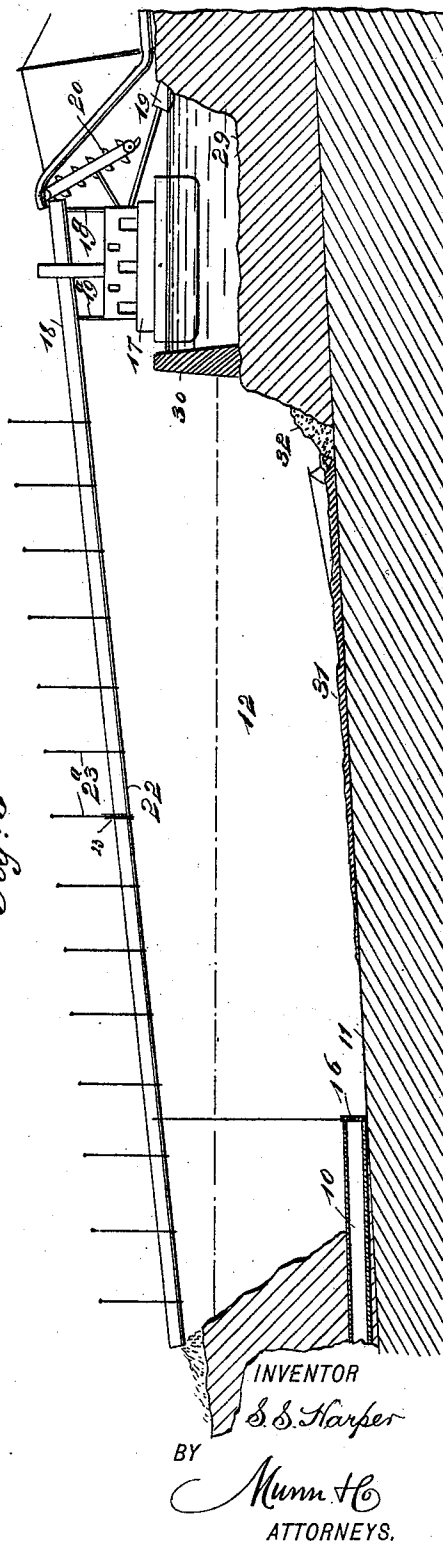
Fig. 2.



WITNESSES:

Chas. Nida.
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Fig. 3.



INVENTOR

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ATTORNEYS.

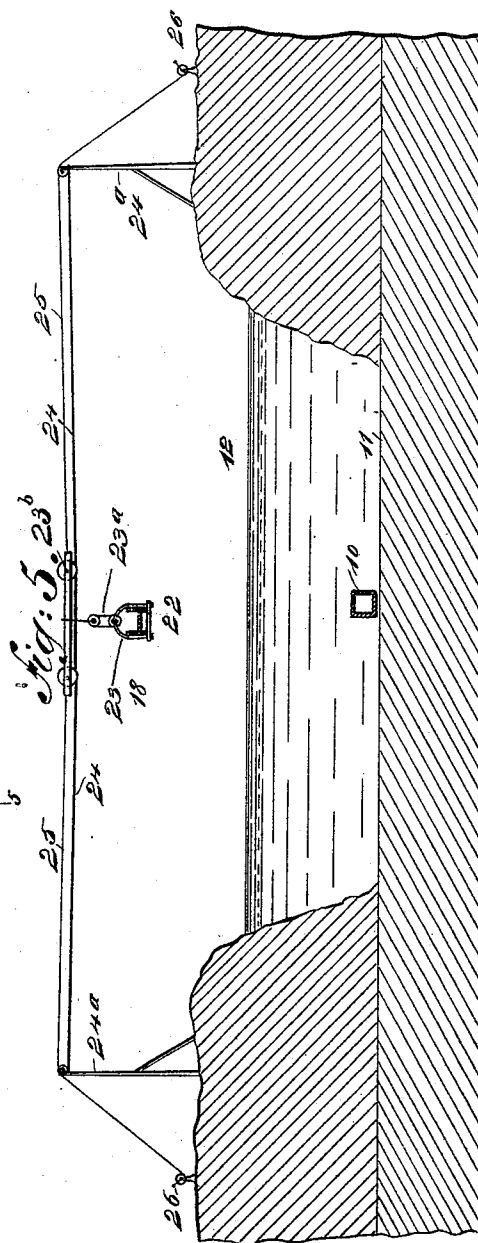
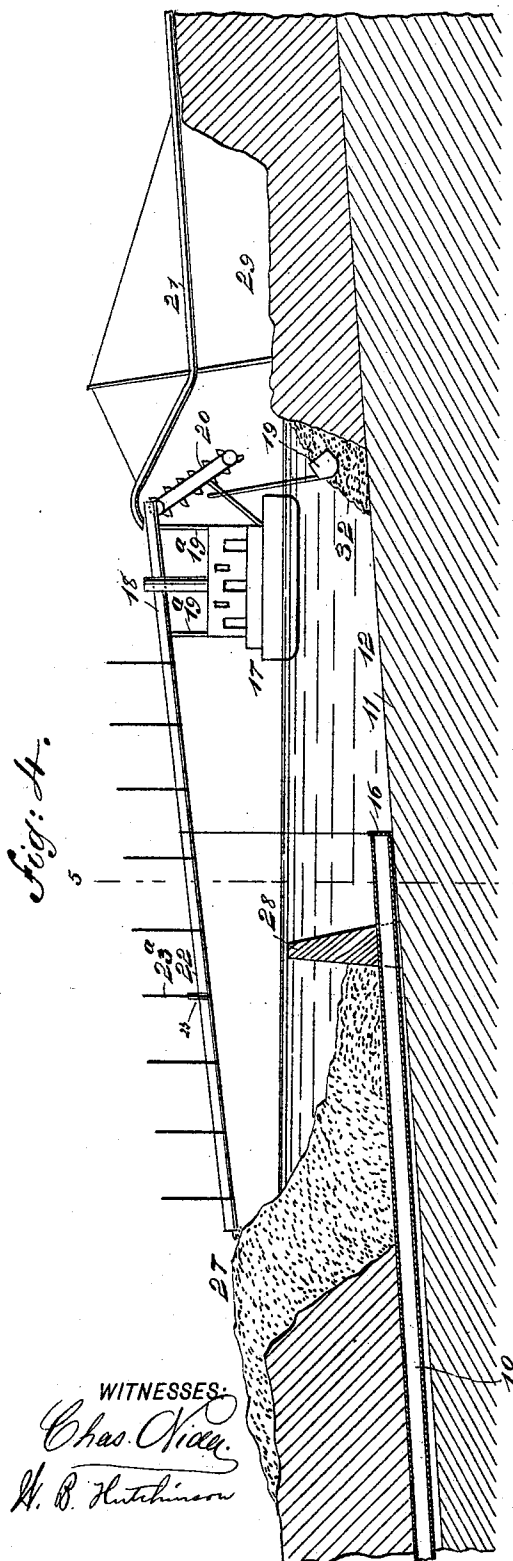
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UNITED STATES PATENT OFFICE.

SAMUEL S. HARPER, OF DENVER, COLORADO.

PLACER MINING.

SPECIFICATION forming part of Letters Patent No. 539,054, dated May 14, 1895.

Application filed August 10, 1894. Serial No. 519,987. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL S. HARPER, of Denver, in the county of Arapahoe and State of Colorado, have invented a new and Improved Method of Placer Mining, of which the following is a full, clear, and exact description.

My invention relates to an improved method of placer mining, and incidentally to certain features of the apparatus used in connection with my method, and my method is particularly adapted to mining in places where ordinary means cannot be employed to advantage.

My method contemplates using a dredge to raise the gold-bearing gravel and deliver it to a flume or a series of sluice boxes, and to provide means for draining the pit which the dredger digs, to the end that the gold which escapes the dredger and accumulates on the bed rock bottom of the pit may be recovered, this draining of the pit also enabling the bed rock to be scraped and all the gold secured.

In using dredgers in placer mining, difficulty has heretofore been experienced in making a satisfactory connection between the dredger and the flumes or sluice boxes, and my method contemplates arranging movable flumes or sluice boxes so that they may be kept always in easy communication with the dredger, so that the raised material may be delivered into the said flumes or sluice boxes without any considerable expense and without wasting material. Another difficulty in this sort of work has been experienced in taking care of the tailings, but by my method a submerged dam is arranged across the pit, which holds the tailings in check and enables the pit to be drained and the bed rock scraped, as hereinafter specified. In this connection another novel feature of my improved method consists in providing a channel which is kept flooded by a temporary dam, and in which the dredger may float and be at work while the pit previously digged is having its bottom scraped.

To these ends my invention consists of an improved method of placer mining and certain novel apparatus for carrying said method into effect, all of which will be hereinafter fully described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification,

in which similar figures of reference indicate corresponding parts in all the views.

Figure 1 is a diagram illustrating the manner in which my method is carried out where there is an adjacent stream to draw from. Fig. 2 is a sectional view showing the arrangement of the dredger, the pit, and the drain of the latter. Fig. 3 is a sectional elevation showing the position of the dredger in the channel referred to while the working-pit is drained ready to have its bottom scraped. Fig. 4 is a similar view showing the arrangement of the pit after the submerged dam has been erected to hold back the tailings and the dredger again floated in the working-pit, so as to remove the material which has been scraped up on the pit bottom; and Fig. 5 is a cross-sectional view showing the means for adjusting the flume or sluice-boxes to suit the position of the dredger.

In carrying out my invention, an open ditch is begun at a point far enough below the ground proposed to be worked, and this ditch runs at a grade barely sufficient to allow water to flow through it. When the said ditch has reached a depth of from ten to fourteen feet, it is continued underground in the form of a tunnel 10, until, by running at a lesser grade than the bed rock 11 of the placer, it eventually reaches the bed rock. This open cut and tunnel is for the purpose of draining the bed rock 11 and the pit 12 which is dug above it. When, however, the open cut and tunnel cannot be used to advantage, the pit may be drained by means of a pump and suitable pipes. The tunnel 10 is continued into the pit along the bed rock as the pit is dug, and the tunnel, which is in the form of a square wooden box large enough to be entered and cleaned may be held down by suitable bowlders and it has at its upper end a controlling or head gate 16.

As illustrated in the drawings the pit is supplied with water from a stream 13, and to enable the desired quantity of water to be provided, the stream is dammed, as shown at 14, and its course diverted through a supplemental channel 15 around the placer ground, which is being worked. The head gate is kept closed when the dredger 17 is being worked, so that the pit may fill and float the dredger. The dredger may be of any approved kind

and it is provided with a suitable dipper 19 and elevator 20 to deliver the gravel, which it raises, into the flume or sluice box 18 which is carried on supports 19^a on the dredger, is held at an inclination, is adapted to connect with the extension sluice boxes described presently, and is supplied with water by means of a pipe 21 connecting with the stream 13 or with another source of supply.

The sluice box or flume 18 connects with the sluice boxes 22, which are made up in sections to form a continuous flume and thus they may be made of any length and, as the dredger progresses up stream, the lower sections of the sluice box or flume may be removed and placed next the sluice box 18. This construction is not shown in detail, as the sluice boxes are not claimed and may be fastened together in any convenient manner. It is essential, however, that the flume formed by the sluice boxes be movable laterally and vertically, as well as extensible longitudinally, so that the flume may always be in connection with the sluice box 18; and to this end the sluice boxes 22 are hung in yokes 23, see Fig. 5, which yokes connect by pulley blocks 23^a with a trolley 23^b, and the pulley blocks are of the kind which are well known to the trade, and which, when adjusted, remain in the position in which they are placed, and thus the yokes and sluice boxes may be easily held at any necessary height. The trolleys run on cross cables 24 which are arranged at necessary intervals and extend across the pit 12, the cables being secured to suitable supporting posts 24^a on opposite sides of the pit. The trolleys have cables 25 secured to them at opposite ends, which cables connect with winches 26 adjacent to the posts 24^a and thus by winding up the winches on one side of the pit and unwinding those at the other, the trolleys of the sluice boxes may be shifted as desired.

The above described arrangement for hanging the sluice boxes is of great importance as it enables the boxes to be shifted laterally if desired, so as to make the proper connection with the dredger, and, as the yokes are independently adjustable, it will be seen that even though the ground be practically level, the sluice box may be supported so as to make a steep continuous grade. It will also be seen that when a sluice box is removed from the lower end of the complete flume, the last remaining sluice box may be let down until it is at the same height above the water as was the sluice box just removed, and the whole line of sluice boxes may be correspondingly changed, thus maintaining a uniform grade. It is clear that a complete flume may be changed laterally, vertically, or up and down without taking it apart, the only thing necessary, as the flume is moved upward being to take a sluice box from the lower end of the flume and transfer it to the upper end. The arrangement above described also enables the flume or sluice box to be held at a steep pitch, so that

a comparatively large amount of gravel may be washed with a small amount of water.

In starting the work on the pit the gravel raised by the dredger is dumped on the bank of the pit, as shown at 27 in Fig. 2, but as the work progresses the lower sections of the sluice box are removed and transferred to the upper end and the tailings are dumped into the lower end of the pit which has been previously scraped, as will be described presently; these tailings being prevented from encroaching too far on the pit floor by means of a submerged dam or crib 28, which is erected while the pit is drained, as will be presently described, and this crib or dam is preferably of openwork, so that it may be cheaply made, being composed of cross poles covered on the lower side by cheap muslin to prevent the fine sludge and slickens from passing through the dam, and the muslin is protected by boughs sunk and held opposite it.

In carrying out my method, the pit is started and the gravel washed, as specified, and when the pit has attained a sufficient size, a channel 29 is opened on the upper side of it of sufficient depth to float the dredger, the dredger is floated into the channel, and a temporary dam 30 erected across the mouth of the channel so as to separate it from the working pit 12. The drain 10 is then opened so as to drain the working pit, and this enables the thin layer of gravel 31, see Fig. 2, left on the bed rock of the pit to be scraped up by workmen, as shown at 32 in Fig. 4, so that when the pit is again flooded this valuable gravel may be raised. Meanwhile, the dredger is at work on the channel 29, starting a new pit, and after the bed rock of the first pit has been scraped the drain 10 may be continued across it in the form of a wooden box held down by bowlders or other means, the dam or crib 28 erected, the pit 12 reflooded, the dam 30 removed, and the work proceeded with as before.

When the dredger 17 is to excavate a cut ahead into the bank any considerable distance, it is necessary to add a number of sluice boxes to the string of boxes of the flume, but when this cut has been excavated and it is desired to return the dredger and begin a new cut on the face of the bank, then these added sluice boxes, together with the ropes or cables 24 suspending them, would be in the way and prevent the dredger from backing down. This difficulty is met by laying tracks on the roof of the dredger cabin, upon which run light trucks of any approved kind. The head sluice box and the stringers upon which it rests, are lowered until the upper ends of these stringers rest upon the said trucks. The yoke supporting the flume is then removed, the cables 24 slackened, and the sluice box running along the track on the roof of the dredger cabin, permits the dredger to be backed down until the lower end of this particular sluice box is reached, when the operation is repeated, and so on until the necessary number of sluice box sections have been re-

moved. As many sections of the sluice boxes can be taken down and placed on the cabin roof of the dredger as is desirable, and then the dredger may be permitted to drop downstream the necessary distance. It will be seen that after the work is well begun, the tailings from the pit being dug, may be deposited in an old pit which has been previously cleaned out.

If it is considered desirable to work placer gravel by my method where the quantity of water obtainable is insufficient to wash the amount of gravel intended to be handled by any of the ordinary methods, then a steam pump can be placed upon the dredger 17 and the water pumped from the pit 12 into the sluice box 18, in which, together with the sluice boxes 22, the gravel may be washed.

After the first pit is completed the gravel, tailings and water can be returned to the working pit 12, and the water used over and over again. The only water lost in this case is that which is let off by the drain 10 when it is necessary to drain the pit to enable the bed rock to be cleaned, which is only once or twice during a season. It will be seen that the grade of the flume may be regulated as the work progresses up stream, by adjusting the height of the cross cables 24 and hangers 23^a.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The herein-described method of placer mining, which consists in dredging a pit in the ground being worked, damming the stream and diverting it around the pit, washing the dredged gravel, draining the pit, and then cleaning up the bed rock of the pit and washing the scrapings.

2. The herein-described method of placer mining, which consists in dredging a pit in the working gravel, washing the said gravel, dredging a channel from the working pit, floating the dredger in the said channel, drain-

ing the working pit, scraping the bed rock of the pit, reflooding the pit, and dredging and washing the scrapings.

3. The herein-described method of placer mining, which consists in dredging a pit in the working gravel, washing the dredged gravel, dredging a channel opening from the working pit, floating the dredger in said channel, erecting a dam to separate the channel from the working pit, draining the working pit, scraping the bottom of the pit, erecting a crib across the pit to hold back the tailings, removing the temporary dam, and dredging and washing the scrapings of the pit.

4. The combination, with the dredger, of the sluice boxes in connection therewith, formed of removable or separable sections and mechanism for moving the sluice boxes; substantially as described.

5. The combination, with the dredger of the transverse cables, the trolleys movable on the cables, the sluice boxes formed of removable or separable connections suspended from the trolleys, and the sluice box on the dredger arranged to deliver into the sluice box on the trolleys, substantially as described.

6. The combination with the dredger, and the sluice boxes thereon, of the flume of connected sluice boxes or sections, the yokes supporting the said sections, the cables, and trolleys running on the cables and supporting the yokes, substantially as described.

7. The combination, with the dredger and its sluice boxes, of the flume of connected sluice boxes or sections, the yokes supporting the said sections, the cables, the trolleys held to run on the cables, and the adjustable pulley blocks connecting the yokes and trolleys, substantially as described.

SAMUEL S. HARPER.

Witnesses:

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JAMES J. BALL.