

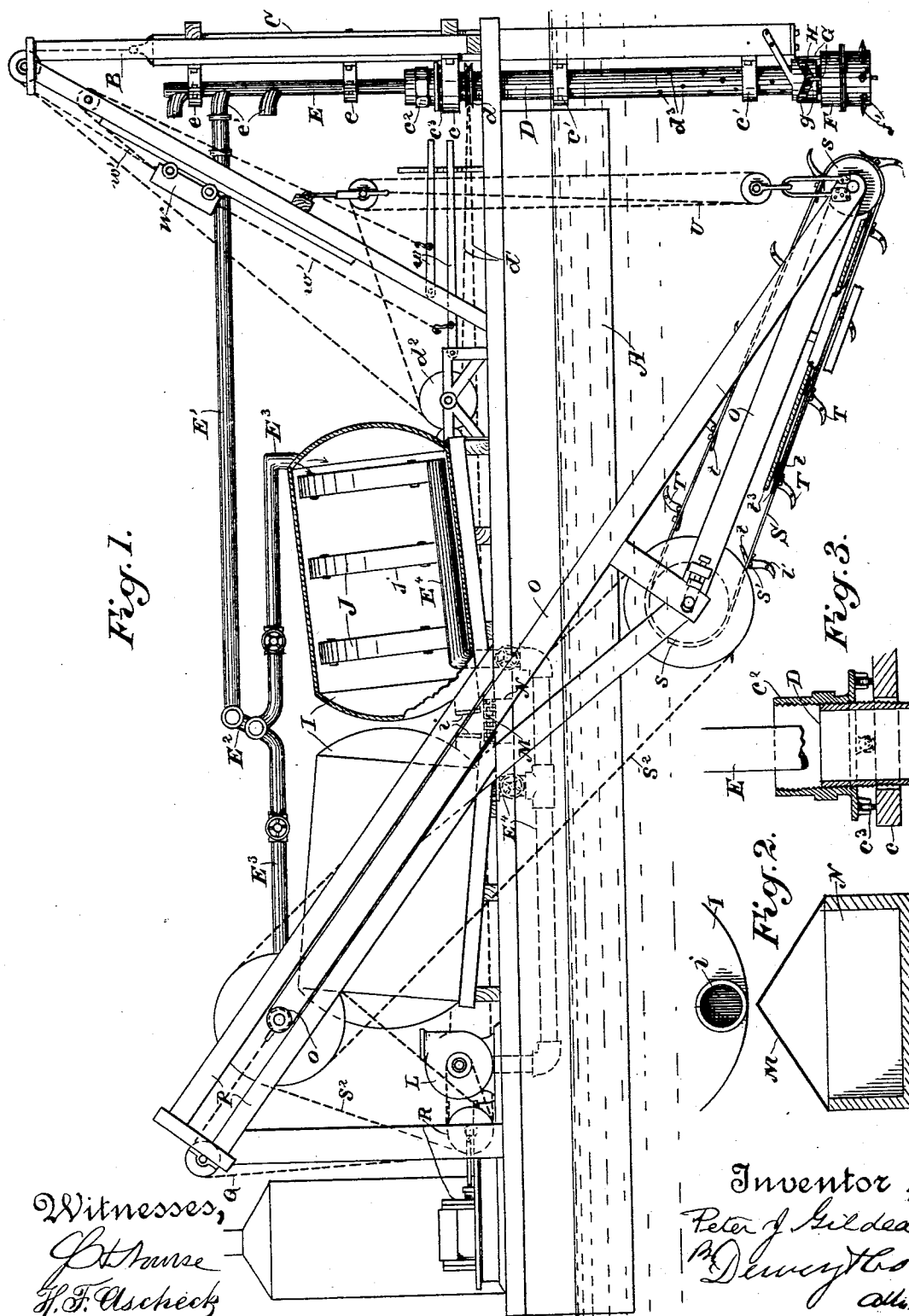
(No Model.)

2 Sheets—Sheet 1.

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MINING DREDGING APPARATUS.

No. 580,269.

Patented Apr. 6, 1897.



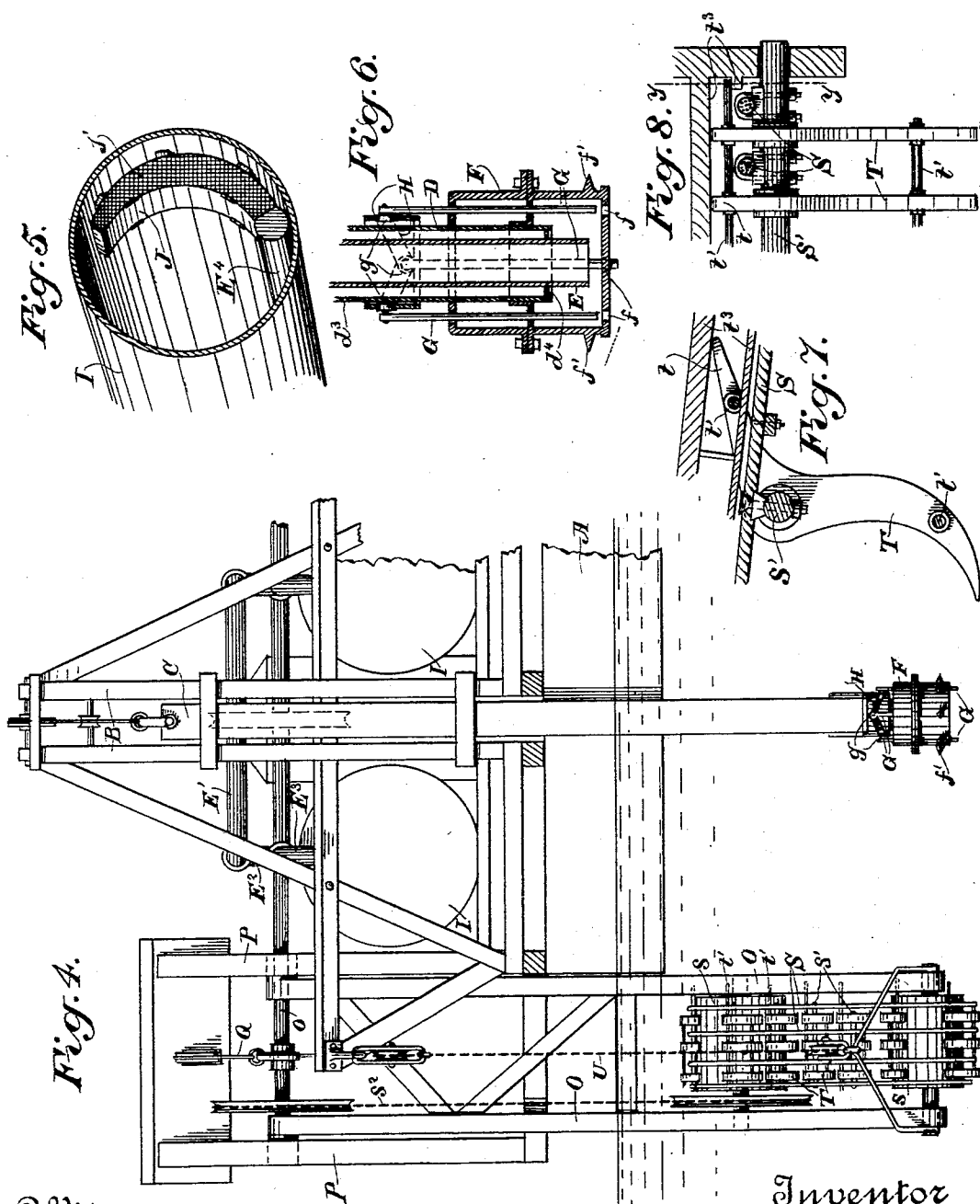
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UNITED STATES PATENT OFFICE.

PETER J. GILDEA, OF SAN FRANCISCO, CALIFORNIA.

MINING DREDGING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 580,269, dated April 6, 1897.

Application filed November 13, 1896. Serial No. 611,927. (No model.)

To all whom it may concern:

Be it known that I, PETER JAMES GILDEA, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Mining Dredging Apparatus; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to that class of dredgers in which a suction-pump is employed to raise the material. My dredger may be applied to various uses and the raising of various material, but is especially intended for use in mining operations in raising to the surface material from which the precious metals may be separated or extracted. In machines of this class a serious difficulty has been encountered in keeping the suction-pipe from becoming clogged, as these devices operate in gravelly and sandy material and are therefore very likely to become choked.

One of the objects of my invention is to provide a means for keeping the mouth of the suction-pipe clear, said means acting at the same time to scratch up and stir the material, thus working down to the bed-rock.

Another object of my invention is to provide simple and effective means for clearing away the larger rocks and material from the field of suction; and a third object is to protect the suction-pump by simple and effective means of screening the material in its passage to the pump.

With these objects in view my invention consists of what may be termed a "screen-chamber," inclosing the mouth of the suction-pipe, and means for keeping the screen-chamber clear; and it further consists in the novel clearers for said screen-chamber and the means for operating them, said clearers acting also as scratchers or agitators for working up the material in the sphere or field of suction.

It also consists in the novel means by which the larger rocks and pieces too large to pass into the screen are continually kept away from the sphere of suction; and it also consists in the novel screen-tanks let into the suction-pipe intermediate of its mouth and

the suction-pump; and it finally consists in the novel details of construction, arrangement, and combination which I shall hereinafter fully describe and claim by reference to the accompanying drawings, in which—

Figure 1 is a side view of my apparatus. Fig. 2 is a detail of the screen-box into which the tank discharges. Fig. 3 is a section of the adjusting and supporting nut of pipe D. Fig. 4 is a partial front view of the apparatus. Fig. 5 is a perspective of the inside of tank, showing one of the screen-boxes. Fig. 6 is a vertical section of the clearer mechanism about the mouth of the suction-pipe. Fig. 7 is a detail of one of the rake-teeth, being a section on line *yy* of Fig. 8. Fig. 8 is a front view of the rake-teeth.

A represents a suitable float. At one end of this float is mounted and adapted to move vertically in suitable guides B a bar C. From a bracket *c*, connected with this bar, is suspended a pipe D, which passes downwardly through suitable bearings *c'* and is mounted therein in such a way that it may be rotated. This pipe can be vertically adjusted in any suitable manner, and for this purpose I have here shown an adjusting-nut *c''*, screwed upon its upper end and having a flange provided with antifriction-rollers *c'''*, operating upon the bracket *c*. By rotating this nut the pipe D may be raised or lowered to adjust it to proper position.

E represents a vertical branch of the suction-pipe. This pipe is secured to the bar C by means of clamps *e*, which hold it to the bar and enable it to be vertically adjusted by loosening the clamps and setting them up again. This branch of the suction-pipe extends down through the rotating outer pipe D and terminates just below the lower end of said pipe. The suction-pipe is non-rotatable.

Secured to the lower end of the rotatable outer pipe D is a casing F, the lower end or bottom of which is provided with a number of holes or perforations *f*, thus forming said box into a screen-chamber and protecting the mouth of the suction-pipe, which opens out freely into said chamber. Passing downwardly through the box are the clearer-rods

G, the lower ends of which are adapted to reciprocate through the holes or perforations *f* of the box-bottom. The upper ends of these rods are provided with roller-studs *g*, which travel in a fixed grooved cam H, supported by the bar C. Now it will be seen that by the rotation of the pipe D and the box F with it the rods G will, through their roller-studs *g* and the cam H, reciprocate and cause their lower ends to alternately withdraw inwardly from the holes *f* and to project through said holes beyond the box. These rods keep the holes or perforations clear and prevent the screen-box from clogging and at the same time by their movement in said screen-box keep the material so stirred that the mouth of the suction-pipe will be fully protected and prevented from clogging. These projecting rods also act as scrapers or scratchers upon the bottom of the channel and serve to loosen up the material and to scratch it down to bed-rock. In this office they are assisted, if desirable, by means of cutters *f'*, secured to the sides of the box F.

I do not confine myself to the grooved cam as the only means for reciprocating the clearer-rods, as other well-known mechanical contrivances may be adopted for this purpose, though I consider the means here shown as the best form to effect this result.

The pipe D may be rotated in any suitable manner, but for this purpose I have here shown a pulley *d*, mounted upon a feather on said pipe, so that the latter may move up and down while the pulley remains in its proper position, and from said pulley extends a belt *d'* to a driving power, (represented in outline by *d''*, which may stand for a suitable engine.)

In order to permit water to freely enter pipe D, it is provided with holes *d''*, and this water acts as an air seal if for any reason the screen-box F should become clogged; but in order that this water may not pass too freely to the suction-pipe I apply a stuffing-ring *d'''* to the pipe D to make a comparatively close joint with the suction-pipe.

The vertically-movable bar C is counter-balanced by a weight W, connected by a line with its top, and said weight is adjusted by means of levers *w* and connected lines *w'*, so that said bar may be readily and quickly moved up or down to carry the suction-pipe to its initial place, and then the outside pipe D and the suction-pipe may be separately adjusted, as required.

The vertical branch E of the suction-pipe is provided with any number of separate connections *e'*, located in vertical series, adapting said branch to be connected with another section E' of the suction-pipe, which said section is connected by a double-jointed or pivoted section E² with other sections E³, which open into tanks I. The double-jointed or pivoted section E² enables the vertical branch E to have its adjustment up and down, and at the same time it may be connected by any of its

separate connections *e'*, according to which one comes into position with the adjacent section E'.

In each tank I is a screen-box J, composed of a casing preferably curved in longitudinal contour and rectangular in cross-section, though these shapes are not essential. The sides *j* of this casing are made of screen material and they are hinged to the casing, so that each side may be opened to give access to the interior, if necessary. This screen-casing is secured properly within the tank, and it communicates at its lower end with a continuation E⁴ of the suction-pipe, which thence continues to the pump L, which may be of any suitable character.

The tanks I have outlets *i*, which discharge upon the apex of a double inclined screen M, surmounting a receiving-box N. The position of these tanks, and I may say at this point that there may be one or more of them in the suction-channel, is for the purpose of saving the pump by screening the material before it reaches it. Only such particles as are desired will pass through the screen-casing J within the tank and thence to the pump. The larger particles will collect in the tank and can be drawn off through the outlet *i* and a separation again effected by the double inclined screen M, whereby the larger and worthless particles are disposed of, while those that may be still valuable are caught within the box N.

Now in order to dispose of the larger rocks and pieces on the bottom which cannot pass through the protecting-casing F of the suction-pipe I provide the following means, which may be termed a "rake" when used in one way and an "elevator" if used in another. Extending downwardly and at an angle from the float are the beams or timbers O. These are suitably braced and trussed below, and at their upper ends they unite in a cross-head *o*, and said cross-head plays between guide-timbers P, whereby it may be adjusted up and down. With the cross-head is connected an adjusting-line Q, which extends in suitable direction to a power device, such as is represented by the engine R. Thus the beams O, which form a downwardly-projecting framework, may be raised and lowered to position. In the lower portion of this framework are carried suitable pulleys *s*, over which passes an endless traveling carrier S, formed of chains or wire rope or other suitable cables or lines. Upon cross-bars *s'*, fitted to this carrier, are pivoted the rake-teeth T, which have the guide extensions *t*, said teeth and extensions being connected together by cross-ties *t'*, so that the teeth of one row act in unison. The guide extensions *t* of these teeth travel between fixed guides *t''* of the framework O, whereby the teeth are prevented from moving too far in either direction and are held to their operative position, but are adapted when they leave said guides

to be relieved and to turn about their pivotal centers, thus freeing themselves of the material which they scraped along and enabling them to pass around in their course. These
 5 teeth as they come around onto the bottom rake the large stones and pieces away from the vicinity or field of suction, and thus keep the latter as clear as possible. The carrier S is driven in any suitable manner, as by the
 10 cable s^2 , from the engine R.

U represents a suspending-tackle by which the framework O, with its endless rake, may be adjusted in the arc of a circle, in which movement the framework turns about its
 15 cross-head o. The framework O and the rake are here shown on the side of the scow because of the location of the tanks I in the middle; but if the tanks are not used it will be best to put the framework and rake in the
 20 middle of a twin scow. I have before spoken of this rake in some cases acting as an elevator. This will be readily understood without further explanation or illustration merely by supposing it to be constructed so that its teeth
 25 would act as buckets or receptacles to carry the rocks up to some other point instead of merely raking them away. The general arrangement and effect of this mechanism would remain the same.

30 Although I have herein illustrated my apparatus as being mounted upon a float, it is obvious that it could be mounted upon a framework adapted to be supported and to move upon the land and to work down into an
 35 excavation.

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

1. In a dredging apparatus having a suction-pipe, a screen-chamber inclosing the mouth of said suction-pipe and reciprocating pieces operating through the holes or meshes of said screen-chamber to keep them clear.

2. In a dredging apparatus having a suction-pipe, a casing or box inclosing the mouth of said suction-pipe and having holes in its lower side and reciprocating pieces operating through said holes to keep them clear and projecting below whereby they are adapted to
 50 scratch the bottom.

3. In a suction-dredger, and in combination with the suction-pipe, a screen-box inclosing its lower end, longitudinally-slidable rods carried in the box and in line with the holes or
 55 meshes of its screen, means for rotating the box, and means whereby said rotation effects the reciprocating movement of the rods to cause them to move into and out of the holes or meshes of the screen.

4. In a suction-dredger, and in combination with its suction-pipe, an exterior pipe around said suction-pipe and having means for rotating it, a box carried by the lower end of said rotating pipe and inclosing the mouth of
 65 the suction-pipe, said box having holes in its bottom, rods in the box adapted to be recip-

rocated to project through the holes in its bottom, and means operated by the rotation of the exterior pipe and box for effecting the reciprocation of said rods.

5. In a suction-dredger, and in combination with its suction-pipe, an exterior pipe around said suction-pipe and having means for rotating it, a box carried by the lower end of said rotating pipe and inclosing the mouth of
 75 the suction-pipe, said casing having holes in its bottom, rods carried by the casing and adapted to be reciprocated to project through the holes in its bottom and means operated by the rotation of the exterior pipe and box
 80 for effecting the reciprocation of said rods, consisting of a fixed cam and roller-studs on the rods acting on said cam.

6. In a suction-dredger, the combination of a vertically-adjustable bar, a suction-pipe secured adjustably thereto whereby it can be raised and lowered, an exterior pipe around said suction-pipe and suspended adjustably from the bar whereby it can be vertically adjusted, a box upon the lower end of said exterior pipe and inclosing the mouth of the
 90 suction-pipe, said box having holes in its bottom, the clearer-rods adapted to reciprocate through said holes, means for rotating the exterior pipe and box, and means dependent on
 95 said rotation for effecting the reciprocation of the clearer-rods.

7. In a suction-dredger, the combination of a vertically-adjustable bar, a suction-pipe secured adjustably thereto whereby it can be raised and lowered, an exterior pipe around said suction-pipe and suspended adjustably from the bar whereby it can be vertically adjusted, a box upon the lower end of said exterior pipe and inclosing the mouth of the
 105 suction-pipe, said box having holes in its bottom and exterior cutters, the clearer-rods adapted to reciprocate through said holes, means for rotating the exterior pipe and box, and means dependent on said rotation for effecting the reciprocation of the clearer-rods.

8. In a suction-dredger, a means for disposing of the larger rocks and pieces from the field or sphere of suction consisting of a series of traveling pieces adapted to engage and
 115 remove said rocks from the vicinity of the mouth of the suction-pipe.

9. In a suction-dredger, a means for disposing of the larger rocks and pieces from the field or sphere of suction consisting of a series of traveling pieces adapted to engage and remove said rocks from the vicinity of the mouth of the suction-pipe, and an adjustable framework by which said pieces are carried.

10. In a suction-dredger, a means for disposing of the larger rocks and pieces from the field or sphere of suction consisting of an endless traveling carrier provided with teeth, said teeth having guide extensions whereby they are held in position, an adjustable framework supporting said carrier and adapted to adjust it to position, said framework having guides

in which the extensions of the teeth operate, and means for driving said carrier.

11. In a suction-dredger, a tank let into and forming part of the suction-channel, said tank
5 having for a communication with said channel a screen box or casing whereby the material is separated on its way to the pump, and said tank having also a separate outlet, a

screen undersaid outlet and a receiving-box under the screen.

In witness whereof I have hereunto set my hand.

PETER J. GILDEA.

Witnesses:

S. H. NOURSE,
WM. F. BOOTH.