No. 706,195.

Patented Aug. 5, 1902.

G. McKAY.

DREDGE.

(Application filed May 2, 1901.)

(No Model.)

2 Sheets—Sheet 1.

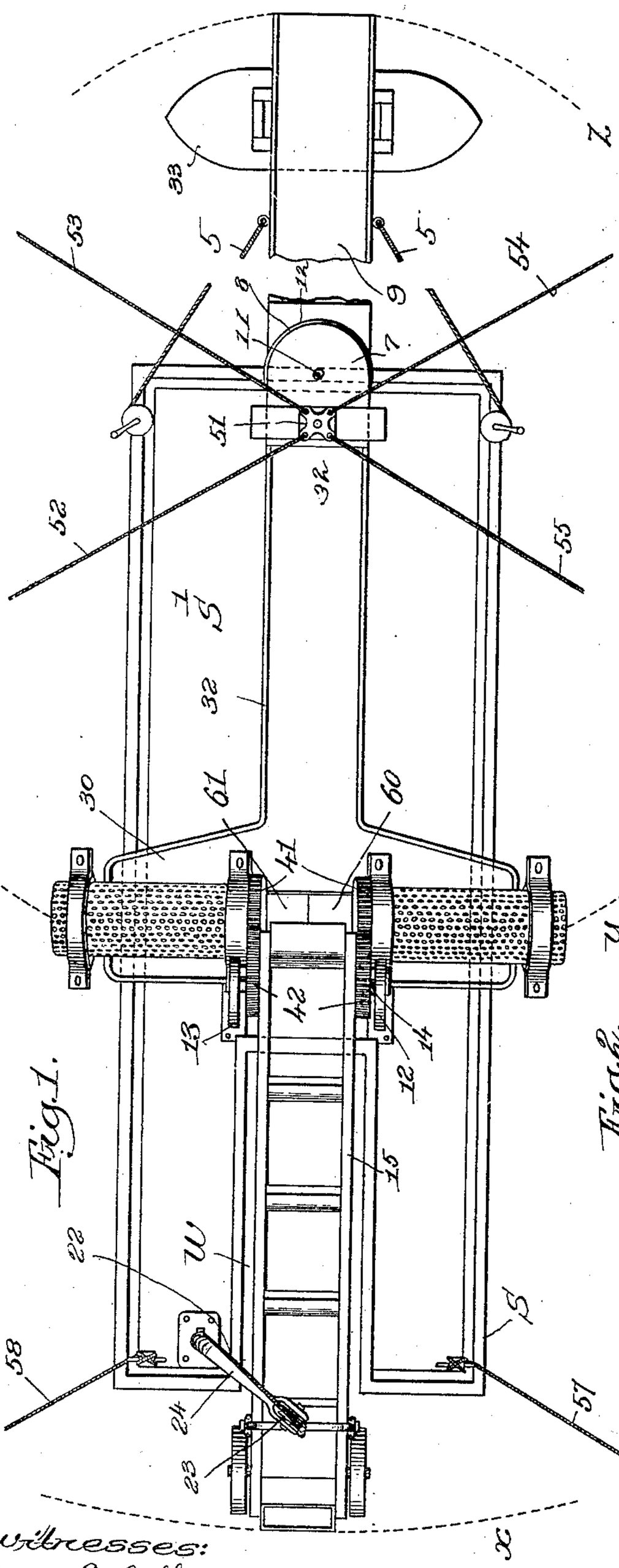

Fig. 1.

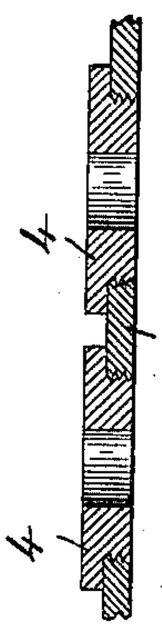

Fig. 5.

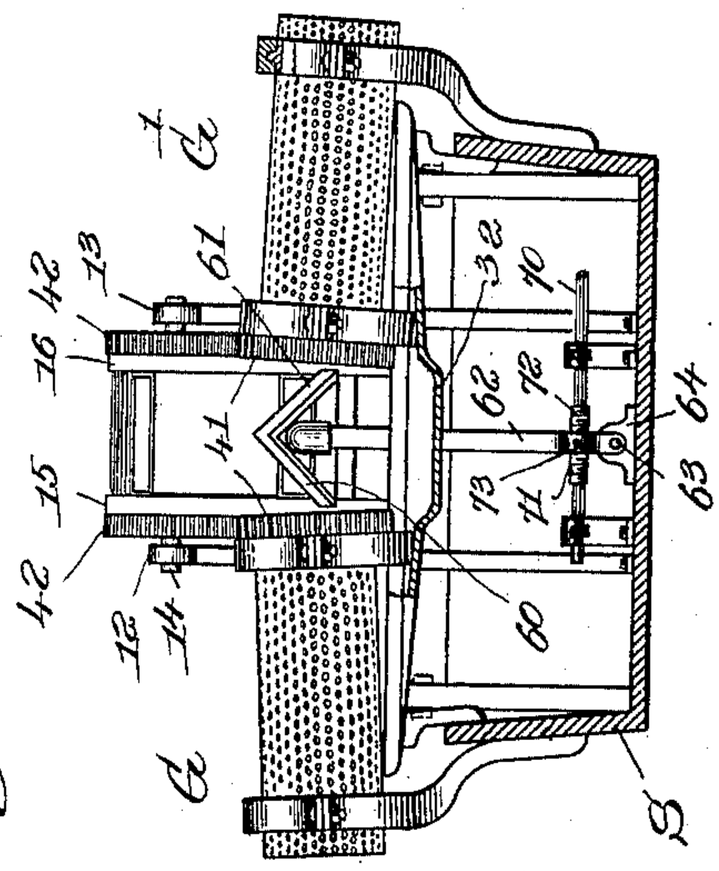

Fig. 2.

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(No Model.) 2 Sheets—Sheet 2.

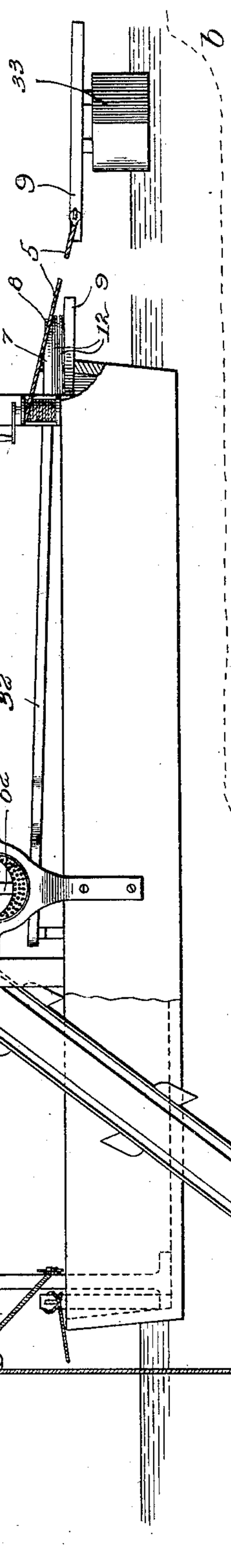

Fig. 4.

Fig. 3.

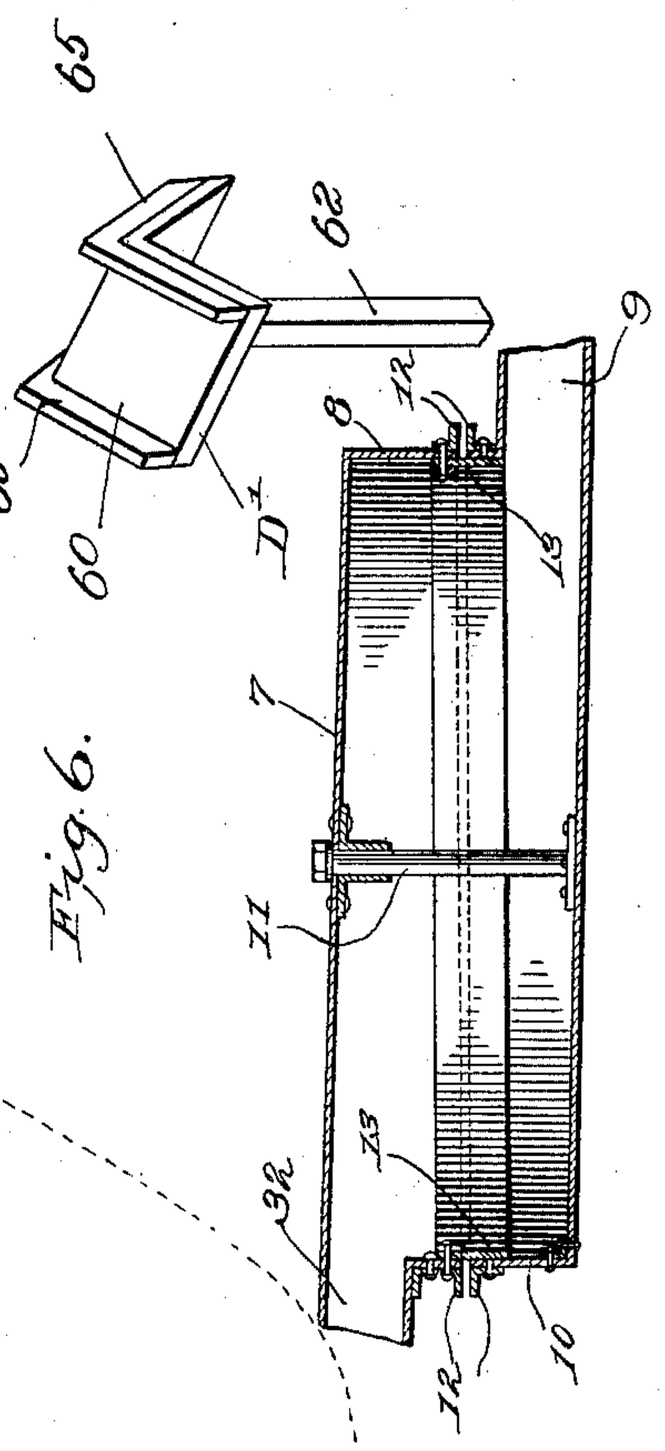

Fig. 6.

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UNITED STATES PATENT OFFICE.

GORDON McKAY, OF NEWPORT, RHODE ISLAND.

DREDGE.

SPECIFICATION forming part of Letters Patent No. 706,195, dated August 5, 1902.

Application filed May 2, 1901. Serial No. 58,506. (No model.)

To all whom it may concern:

Be it known that I, GORDON McKAY, a citizen of the United States, residing at Newport, county of Newport, State of Rhode Island, have invented an Improvement in Dredges, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to an apparatus which is adapted for use in placer-mining.

As is well known, alluvial deposits are oftentimes rich in gold or other precious metals, and in extracting the gold from such auriferous material some suitable form of dredging or excavating mechanism is employed which digs up the material and deposits it in a suitable sluice, where it is washed and the gold extracted in a well-known way. In order to conveniently carry on the dredging or excavating operation, an artificial pond is generally made over the place where the gold-bearing alluvial deposits are, and the excavating or dredging device is mounted upon a suitable scow, which is moored or floated on such pond. In the process of extracting the precious metals, such as gold, from the auriferous material such material is dug up and deposited in a suitable screening device, which allows the finer material to pass through, but delivers the coarse tailings over the side of the scow, the finer material dropping into a suitable sluice, where it is washed and the gold extracted in the usual way. When the dredging operations are carried on under an artificial pond, as above described, it becomes important that the least depth of water in the artificial pond should be employed consistent with the free and proper swinging movement of the scow, for the deeper the water the more expense the dredging operations entail. It becomes necessary, therefore, to provide some systematic way of distributing or delivering the tailings from the dredge, so as to prevent the same from accumulating under the scow or in any part of the artificial pond in such a way as to prevent or obstruct the free movement of the scow, for it will be obvious that if the tailings were discharged in an indiscriminate way, so as to be deposited in heaps, the depth of the water in the artificial pond would have to be so great that the movement of the scow over the pond would not be interfered with by the deposits.

It is the object of my invention to construct an apparatus adapted for placer-mining which includes means for systematically distributing the tailings from the screens and sluices, which are mounted on the scow, said distribution of the tailings taking place in such a way that a minimum depth of water in the artificial pond is sufficient.

In accordance with my invention the material which is lifted by the dredge is divided into two portions, the coarse material being preferably separated from the finer material, and the coarse material is discharged over the sides of the scow, near the front portion thereof, while the finer tailings are discharged from the back end of the scow. The result is that when the scow is in operation a comparatively deep excavation will exist under the front of the scow while the dredge is at work lifting the material, while the back portion of the scow will be situated over the deposit of the coarser tailings, which will partially fill up the deep excavation, but which will still allow sufficient depth of water for the scow to freely swing about its pivot. The fine tailings are delivered back of the scow, where the dredging operations have been performed, and even though the said finer tailings fill up the surface of the pond to such an extent that the scow would not float over where the tailings have been deposited, yet because the scow is situated over the partially-filled excavation it has sufficient depth of water in which to move.

With this object in view my invention comprises a scow or float which is mounted for swinging movement upon a body of water about a center at one end thereof, and at the other end the said scow has a suitable excavating device, which is adapted to dig up the auriferous material and deposit the same into two oppositely-arranged rotating screens or grizzlies, the said grizzlies being situated some distance in front of the pivotal center of the scow and having their discharge ends projecting over the opposite sides of the scow. A sluice having riffles is carried by the scow and has at one end a receiving portion situated underneath the grizzlies, the opposite end of the sluice extending some distance

beyond the pivoted end of the scow and being supported upon a suitable float, the said sluice being either rigidly fixed to the scow or made with a joint near where the sluice passes the back end of the scow, so that the projecting end of the sluice may swing about such joint, and thus be deflected to either side. By virtue of this construction as the dredging operation is carried on and the scow is gradually swung about its center the rotating screens or grizzlies will operate to screen the dredged material, and the coarser material, which does not pass through the screens, will be deposited either side of and beneath the scow and on an arc parallel to the arc on which the excavator works, while the finer tailings will be deposited from the end of the sluice which projects some distance beyond the stern of the scow, and will thus be deposited upon top of the coarser tailings. It will be seen, therefore, that the scow is always situated partially over the excavated place and partially over the deposit of the coarser tailings, and since such coarse tailings are not sufficient to completely fill the excavated place the water will be deeper immediately under the scow than in those places where the excavation has not been carried on or where the finer tailings from the sluice have been deposited on top of the coarser tailings from the screens. With my invention, therefore, the material after having the gold extracted therefrom is deposited in much the same position that it was before working it—that is, the larger stones and coarser gravel are at the bottom and the finer material on top.

Figure 1 is a top plan view of my apparatus. Fig. 2 is a section taken through the dredge just back of the grizzlies. Fig. 3 is a side elevation showing in dotted line the manner in which the tailings are deposited. Fig. 4 is a detail of the deflector hereinafter referred to. Fig. 5 is a sectional detail of the grizzlies, showing the means for varying the size of the openings therein; and Fig. 6 is a longitudinal section through the joint of the screen.

S denotes a scow or float upon which the machinery used in the dredging and mining apparatus is mounted, and, as customary in dredging operations, the scow is mounted for swinging movement by constructing the scow at one end with the post 50, from the upper end of which are extended guy-ropes 52 53 54 55, which are fastened to any suitable windlasses or dead-men upon the shores. The front end of the scow has attached thereto in any suitable way the ropes or cables 57 58, which in turn lead to windlasses or dead-men on the opposite shores of the stream and by means of which the scow may be swung about its pivotal point, as will be obvious. The scow is made at its front end with the usual well W, in which operates the ladder 15, on which is supported the usual chain-and-bucket excavator 21, the said ladder being pivoted at its upper end upon a shaft 14, supported in suitable uprights 12 and 13 upon the scow. This form of chain-and-bucket excavator being familiar and well known in the art further description is not necessary. The front end of the ladder 15 has connected thereto the yoke 26, to which is connected the rope 22, said rope passing over a pulley 23 in the end of the bent arm 24, rigidly mounted at the front end of the scow, the said rope being secured at its free end to any suitable attaching means and serving as a means for maintaining the excavator at any desired elevation. The excavating device operates to dig the material from the alluvial deposit and carry it to two oppositely-disposed grizzlies or rotating screens, (designated, respectively, by G and G′,) the said grizzlies being supported for rotation in any suitable way and at suitable places upon the scow. The discharge or delivery ends of the grizzlies extend beyond the gunwales of the scow, and they are adapted to discharge the coarser material, such as large stones and coarse gravel which are received from the dredger, into the excavation or hole made by the dredge and on each side of the scow, as shown in Figs. 1 and 3. The grizzlies are inclined somewhat, as seen in Fig. 2, in order to facilitate the gravitation of the gravel or coarse material through the same, or the gravel may be carried along by spirally-arranged feather-blades inside the grizzlies, the feed of the material of course being aided by the rotation of the grizzlies. The inner or receiving ends of the grizzlies are provided with the teeth 41, which mesh with gears 42 upon the shaft 14, by means of which construction the rotation of said shaft 14 operates to rotate the grizzlies, it being understood that the shaft 14 is connected to and operated by any suitable engine or motor upon the scow.

Fig. 5 illustrates in detail the construction of the screen or grizzly, the cylindrical body 3 thereof having a series of screw-threaded apertures therein, into which are screwed bushings or hollow plugs 4, by reason of which construction plugs with larger or smaller apertures therein may be used to regulate the degree of fineness in the screening and the depth of the water under the scow, as hereinafter explained.

S′ designates a sluice which will have suitable riffles or other gold-catching means therein, said sluice having at its forward end the hopper or receiving portion 30, which extends underneath both grizzlies and serves to catch the finer material which passes through the apertures therein, the said receiving portion 30 being supported in some suitable way upon the scow. The sluice is usually rigid with the scow and extends beyond the pivoted end thereof for a distance approximately equal to the length of the scow, and when the whole sluice is rigid its discharging end swings upon an arc as the scow moves about its center, the free end of the sluice being supported upon a suitable float 33. As it is often desirable to turn the scow around on its pivoted point

to proceed in a different direction, it is convenient to turn the sluice at an angle with the center line of the scow. I may therefore make my sluice with a swinging joint near the back end of the scow, as seen in Fig. 6, and guy-ropes 5, attached to the end of the sluice, may be used to swing the said sluice in either direction and to hold the same rigid when it has been brought into the desired position, the said guy-ropes being operated by any well-known winding mechanism on the scow. The joint in the sluice is shown in Fig. 6, and, as illustrated, the portion 32 of the sluice is rigid with the scow and is provided with the overhanging circular end 7, having the depending circular flange 8. The projecting portion 9 of the sluice has the upturned circular flange 10, which registers with the flange 8, and the two portions 32 and 9 of the sluice are secured together for relative turning movement by the pivot-pin 11. In order to stiffen the circular flanges 8 and 10, their meeting edges are provided with angle-irons 12, and to make the joint tight I secure to the inside of the flange 8 an annular leather packing 13, which overlaps the joint, as seen in Fig. 6. As illustrated in the drawings, the post 50, to which the guy-ropes 52 53 54 55 are attached, is made forked at its lower end to provide an opening through which the sluice may pass, as plainly seen in Fig. 1.

In order that the amount of material received by each grizzly, and consequently the amount discharged therefrom, shall be approximately the same, I have provided a movable deflector, (shown enlarged in Fig. 4,) designated by D′, which may be adjusted to carry more or less gravel into either grizzly, this being convenient, because when the scow is swinging to one side the buckets will come up more heavily loaded on that side toward which the scow is being fed, and by means of the deflector I can insure the proper distribution of the material to each grizzly. The deflector, as shown, is of substantially inverted-V shape, and between the two oppositely-inclined portions 60 61 thereof, which coöperate, respectively, with the grizzlies G G′, the lever 62 is secured, said lever being pivoted, as at 63, to the bearing or bracket 64 upon the floor of the scow. Preferably the deflector will be provided with flanges or walls 65, which direct or discharge the material into the grizzlies. The lower end of the lever 62 is provided with a nut 73, which engages the screw-thread 72 on a shaft 70, which construction enables the peak of the deflector to be moved either side of the central position, so as to bring the same in proper position to divide the material as it is discharged from the buckets into approximately equal portions, each equal portion moving down or being directed by one of the inclines 60 61 into the adjacent grizzly.

In Fig. 1 the dotted line *x* illustrates the line on which the dredging or excavating device operates, and the dotted line *y* indicates the line on which the coarser tailings from the grizzlies are deposited, they forming the bulk of the tailings and filling up the excavated place, as shown in the dotted line at *a* in Fig. 3, while the dotted line *z* indicates the line upon which the finer tailings are deposited directly back of the scow, these finer tailings further filling up the excavated place, as shown at *b* in Fig. 3. The scow, therefore, is situated partially over the excavated place and partially over the deposit *a* from the grizzlies, as seen in Fig. 3, and obviously the water is deeper in this place than where the tailings from the sluice are deposited, as at *b*. It will be obvious, therefore, that even though the depth of the water in the unexcavated places in the artificial pond or in the path or portion which has already been excavated and which has been filled again by both the fine and the coarse tailings is insufficient to properly float the scow, yet since the scow is supported in the deeper water over the partially-filled excavation, as shown in Fig. 3, the movement of the scow is perfectly free and is not in any way obstructed. It becomes possible, therefore, to employ in the artificial pond a minimum depth of water, which is a decided advantage in apparatus of this class. By making provision for varying the size of the apertures through the grizzlies I can regulate at will the amount of tailings discharged therefrom and height of the deposit *a*, and consequently the depth of the water when the scow is moored, and by depositing the coarse tailings in approximately even quantities on both sides of the scow there is no danger of the same piling up and interfering with the free movement of the scow. Moreover, it is desirable that as large a proportion of the tailings as possible be deposited from the grizzlies without grounding the scow, for the amount of water required in the sluice is thereby reduced. By my construction I can regulate the amount discharged from the grizzlies so as to secure this result, and I consider this an important feature of my invention.

It will be obvious, of course, that various changes may be made in the construction of the parts without departing from the spirit of my invention. For instance, the various guy-ropes may be operated by mechanism on the scow, or a single grizzly may be placed lengthwise of the scow, and troughs may be used to carry the coarse tailings to the opposite sides of the scow, and such troughs may be made adjustable to deposit the tailings at any required point.

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

1. In an apparatus of the class described, a scow, a dredging device at one end thereof, two oppositely-disposed grizzlies located to receive the material from the dredging device and to discharge the tailings over either side of the scow.

2. In an apparatus of the class described, a scow, a dredging device at one end thereof, two oppositely-disposed grizzlies located to receive the material from the dredging device and deliver the coarser tailings at either side of the scow, combined with a sluice located to receive the fine material from the grizzlies and deliver the fine tailings to the rear of the scow.

3. In an apparatus of the class described, a scow, a dredging device at one end thereof, mechanism for separating the coarse gravel from the fine and valuable material, said separating mechanism having side discharges whereby the coarse gravel is deposited either side of the scow, a sluice adapted to receive the fine material from the separating mechanisms, said sluice extending back from the scow and having its projecting end pivotally mounted, and means to maintain the pivoted end of the sluice in any adjusted position.

4. In an apparatus of the class described, a scow pivoted for swinging movement about one end, an excavating device on the front end of said scow, two oppositely-disposed rotating grizzlies or screens in front of the pivotal point of the scow, and projecting at their discharge ends over the sides of the scow, said grizzlies receiving material from the excavator and operating to discharge the coarse tailings on both sides of the scow, a sluice adapted to receive fine material from the grizzlies, said sluice being attached to the scow and extending back thereof a distance approximately equal to the length of the scow, and a float to support the end of the sluice, whereby tailings from the sluice are deposited on top of the tailings from the grizzlies.

5. In an apparatus of the class described, a scow pivoted for swinging movement about one end, an excavating device on the front end of said scow, two oppositely-disposed rotating grizzlies or screens in front of the pivotal point of the scow, said grizzlies receiving material from the excavating device and operating to discharge the coarse tailings on either side of the scow, a sluice adapted to receive the fine material from the grizzlies, said sluice being attached to the scow and extending back thereof a distance approximately equal to the length of the scow.

6. In an apparatus of the class described, a scow or float, a dredge carried thereby, means to separate the coarse gravel from the fine and valuable material, a sluice to receive the fine material, said sluice extending back from the scow, and comprising two sections, one of said sections rigid with the scow and having at its end a joint articulating with the end of the other section, and means for varying the relative positions of the two sections and for holding them in any adjusted relative position, whereby one section may have a lateral swinging movement relative to the other, or may be made rigid therewith.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GORDON McKAY.

Witnesses:

LOUIS C. SMITH,

GEO. W. GREGORY.