

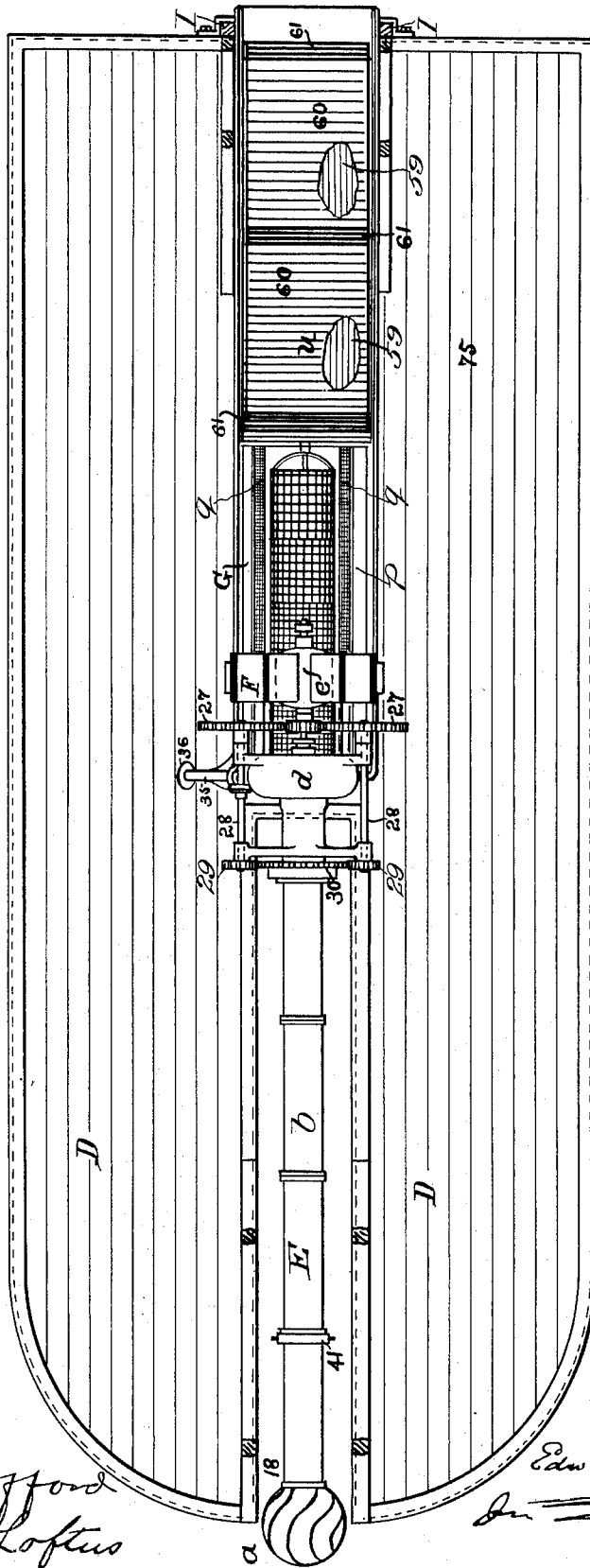
E. A. NEWMAN.
PLACER MINING APPARATUS.
APPLICATION FILED SEPT. 13, 1897.

1,002,602.

Patented Sept. 5, 1911.

4 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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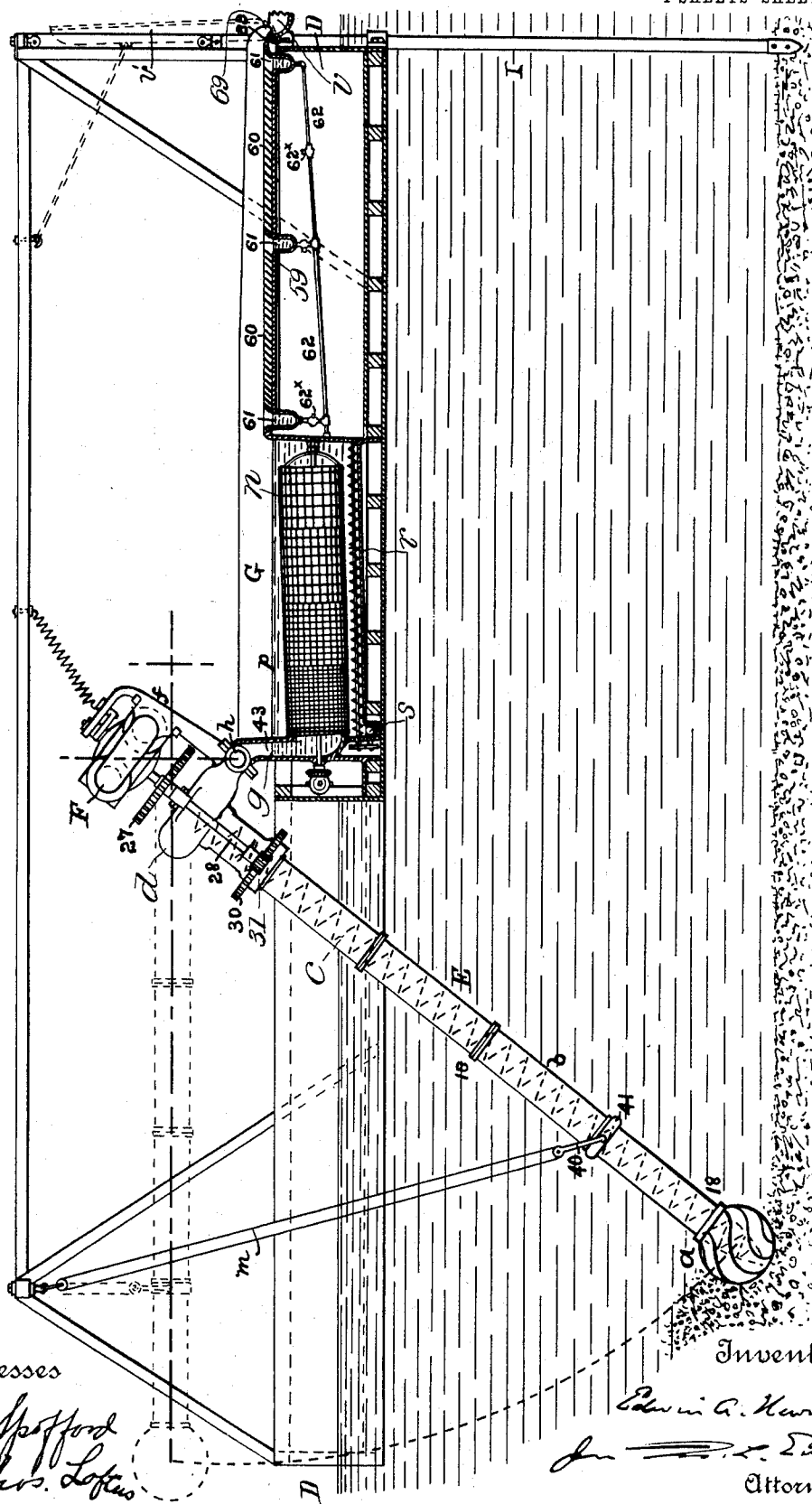
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4 SHEETS—SHEET 2.

Fig. 2.

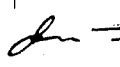


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4 SHEETS—SHEET 3.

Fig. 4.

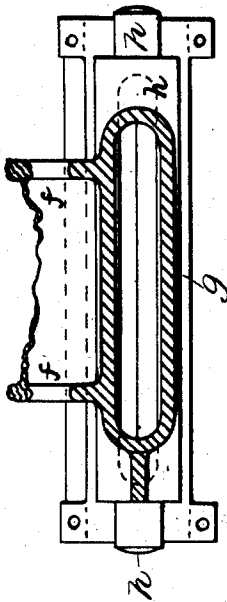
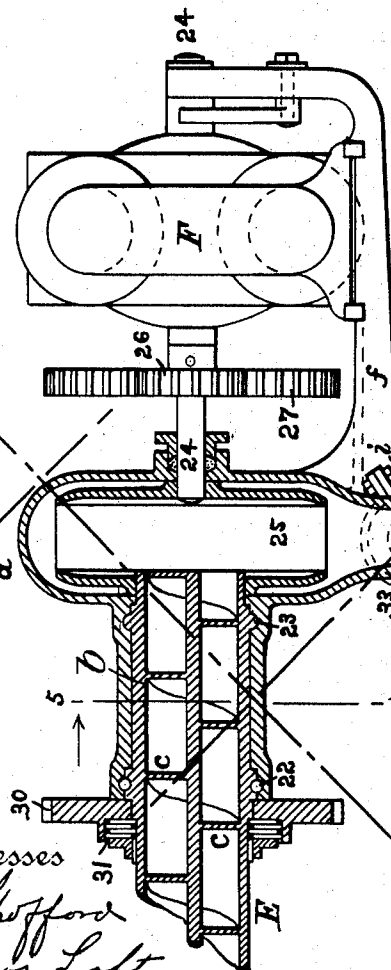
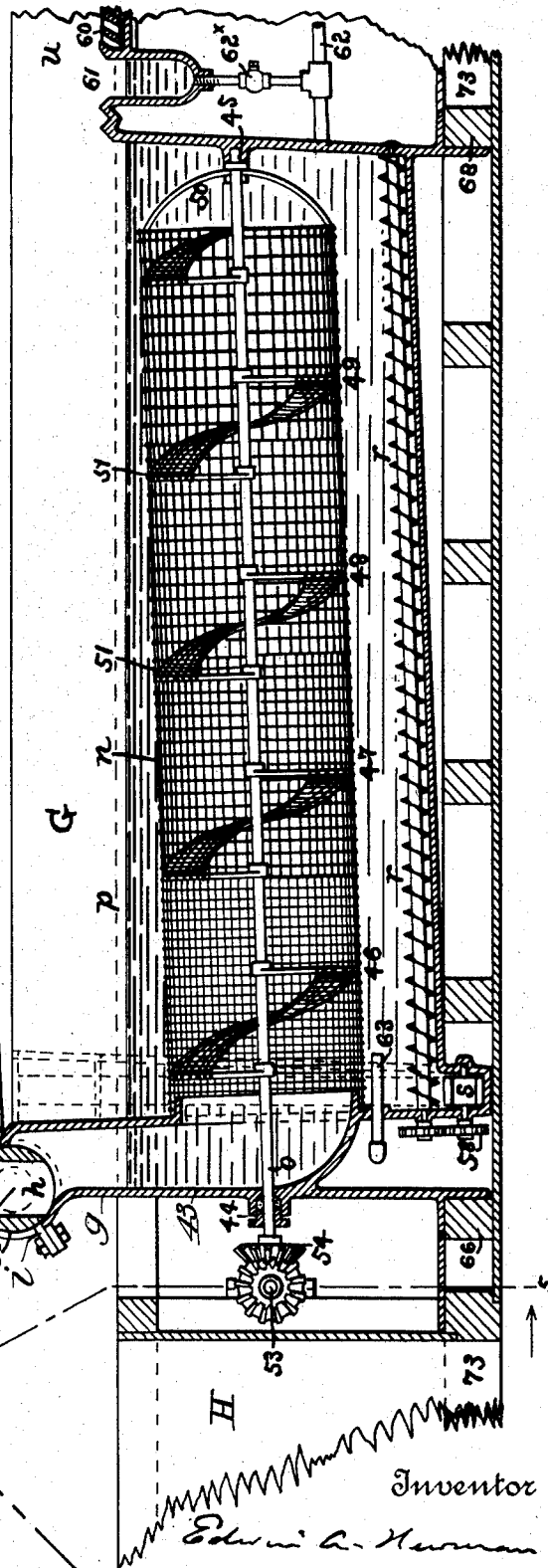


Fig. 3.



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Fig. 6.

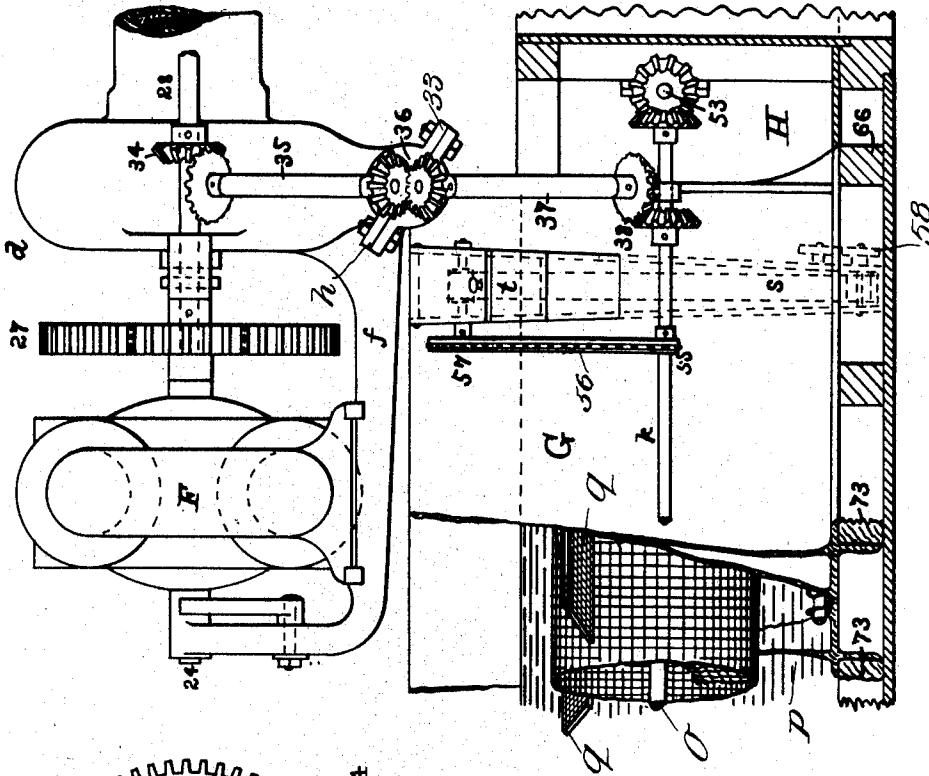
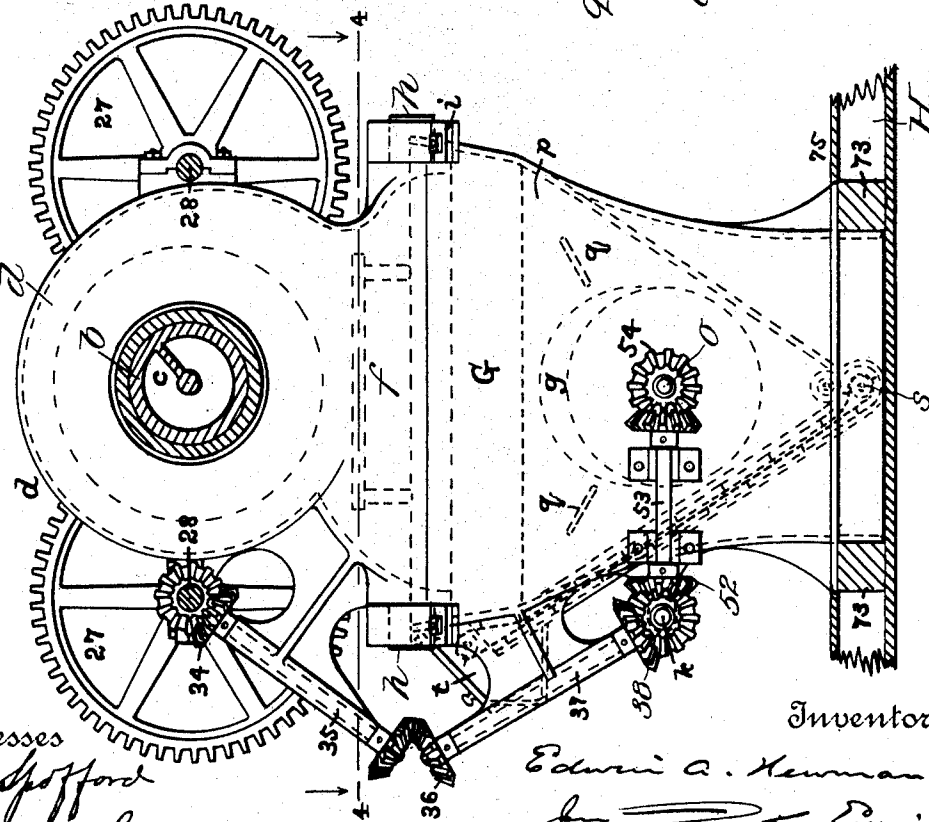


Fig. 5.



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UNITED STATES PATENT OFFICE.

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PLACER-MINING APPARATUS.

1,002,602.

Specification of Letters Patent.

Patented Sept. 5, 1911.

Application filed September 13, 1897. Serial No. 651,542.

To all whom it may concern:

Be it known that I, EDWIN A. NEWMAN, a citizen of the United States of America, and a resident of Washington, in the District of Columbia, have invented a new and useful Improvement in Placer-Mining Apparatus, of which the following is a specification.

This invention relates to apparatus for feeding auriferous "spoil" directly into gold-saving apparatus, and for separating or concentrating such spoil and saving the free gold.

It relates primarily to such apparatus adapted for the direct treatment of such spoil from auriferous beds or banks beneath water capable of floating dredges, but is applicable in part to placer mining apparatus in general.

The objects of the invention include the following, viz: to elevate the spoil to a convenient level, as to a sufficient height above the deck of a floating dredge and there to force the spoil into a bath of mercury by one and the same means; to utilize for such purpose a rotary motor and a rotary pump having one and the same axis and bed-frame; to raise and lower the suction pipe by the same motor; to operate a rotary drum submerged in the mercury bath by the same motor; to operate gold conveyers for positively and automatically discharging the gold from the bottom of the mercury bath by the same motor; to provide for the separation of the sand and gravel from the gold and mercury in an effective manner and to save any mercury and gold that may escape from the bath with the water and sand.

Four sheets of drawings accompany this specification as part thereof.

Figure 1 is a plan view of the improved apparatus in place upon a conventional floating dredge, showing the suction pipe and the parts movable therewith in the elevated position of the former; Fig. 2 is a sectional side elevation of the apparatus and conventional dredge, showing the suction pipe and parts movable therewith by full and dotted lines respectively in the lowered and elevated positions of said pipe; Fig. 3 represents a longitudinal section through the suction pipe pump and gold

saving apparatus on a larger scale; Fig. 4 represents a fragmentary section on the line 4-4 Fig. 5, through a passage-forming hinge connecting the pump housing and mercury bath; Fig. 5 is a sectional end-elevation of the parts shown in Fig. 3 on the same scale; and Fig. 6 is a sectional side-elevation projected from Fig. 5.

Like letters and numbers refer to like parts in all the figures.

The drawings show my improved apparatus as adapted for removing auriferous deposits from beneath water and then and there treating the same for the recovery of the free gold. As thus adapted, or as adapted for working dry placers in the vicinity of navigable streams, the apparatus includes a floating dredge, D, Figs. 1 and 2, which for the purposes of the present invention may be of any known or improved construction.

For collecting the gold and elevating the same above the decks of the dredges, each dredge carries a suction "excavator" and elevator E, comprising a head *a*, a suction-pipe *b*, of which said head forms the entrance, a direct-acting screw *c*, within said pipe, and a rotary pump *d* at its upper end.

The head *a* is rotary, and is preferably and conveniently made fast to the inlet end of the pipe *b*, by a bolted joint 18, and rotated by means of the pipe. It is preferably constructed, with laterally opening inlet ports on all sides, and with ingathering cutters or "spoons" projecting behind said ports as compared with the direction of rotation, and curved both longitudinally and transversely, with reference to effective action. Grains of gold are by this means picked up, together with the accompanying fine sand, and directed into and through the ports, so as to insure their entrance into the pipe *b*, and their elevation together with the more mobile gravel overlying the gold; and this is done with the least possible disturbance of the surrounding gravel and sand, so as to avoid the gravitation of dislodged grains and nuggets to greater depths and perhaps out of reach. The head *a* is primarily designed and adapted for work in gravel banks, but may be adapted to cut into bed-rock, as well as to dislodge conglomerated gravel, where pay dirt, as indi-

cated by the gold-saving apparatus, justifies following a given lead in any direction.

The pipe is coupled to the housing of the pump *d* by swivels 22 and 23, one or each of which may be a ball-bearing as shown at 22 in Fig. 3. I prefer one or more ball-bearings 22 protected above by a strong swivel and packing joint, such as represented at 23, in Fig. 3.

From a suitable generator of electricity two conductors are extended in customary manner to the respective poles of an electric motor *F*, of approved construction comprising a rotary armature; the axial shaft 24 of which armature conveniently carries the piston 25 of the pump *d*, and at the same time rotates through gears 26 and 27, countershafts 28 and gears 29 and 30, the suction-pipe *b*, and therethrough the excavating head *a* and elevating screw *c*. The annular gear-wheel 30 of the reducing train ending thereat is loose on the pipe *b*, and made fast at will by a friction clutch 31, Figs. 2 and 3, which is furthermore adapted to yield under given stress so as to protect the excavating apparatus and driving mechanism against breaking strains. The lower part of said housing of the pump *d* and a bed-frame for the motor *F* are conveniently united in a single casting *f*, Figs. 3, 5 and 6, which is hinged directly to the end-piece or abutment *g* of a gold-saving apparatus *G* by a horizontal joint *h*, Figs. 3 and 4, the slotted knuckle or shaft of which is integral with said frame-casting *f*, as shown at 32, Fig. 3, while its socket, 33, Figs. 3-6, is formed on said end-piece *g*, with the aid of a bolted cap *i* of suitable construction. The excavator and elevator *E*, turns on said joint *h* when its head *a* is raised or lowered, while the passageway through the joint is always open.

For raising and lowering the head *a*, rotary motion is transmitted, as best shown in Figs. 5 and 6, from the countershaft 28 on one side of the pump *d* by a pair of bevel-gears 34 and a countershaft 35 to a pair of bevel-gears 36, whose pitch-line where the gears intermesh is coincident with the axis of said joint *h*. From this point motion is transmitted by a countershaft 37 and bevel-gears 38 to a line shaft *k*, and from the latter to a windlass, upon which the rope or chain of a hoisting tackle *m*, Fig. 2, winds and unwinds. The clevis 40 of said tackle is trunnioned to a ring 41, which is swiveled on the suction-pipe *b* beyond one of the joints 18 by antifriction balls.

While the excavator and elevator *E* is at work in the position in which it is shown in full lines in Fig. 2, and for a sufficient length of time to thoroughly empty it after it is elevated, as in dotted lines in Fig. 2, the head *a* pipe *b* and screw *c* are rotated and the pump *d* worked by the motor *F*.

The spoil thus elevated or conveyed into the casing of the pump *d* is discharged by the same down a diving passage 43, Figs. 2 and 3, within the end-piece *g*, into the receiving end of a rotary drum *n* which is carried by a longitudinal shaft *o* within the main chamber *p* of the gold-saving apparatus *G*, beneath the surface of a bath of mercury. For other details of this device attention is directed to Figs. 3, 5, and 6. The shaft *o* enters the mercury space through a stuffing-box 44, Fig. 3, and is supported at the other end of the chamber by a cup-bearing 45; the drum *n* comprises screens 46, 47, 48 and 49 of increasing mesh, which retard the escape of solid matter, and its tailings-end 50 is elevated sufficiently to insure a free discharge therefrom, while an internal spiral flange 51 insures a positive feed of the larger stones and particles therethrough. A pair of fixed inclined screens *q*, Figs. 5 and 6, at the sides of the drum *n*, deflect the floating matter laterally, so as to distribute the ebullition over the surface of the mercury. The sides of the chamber *p* converge downward as shown in dotted lines in Fig. 5, so as to reduce the space to be filled with mercury, and unite at bottom in a half-round trough for a screw-conveyer *r*, Fig. 3, which carries back nuggets and other heavy particles to the front end of the apparatus, where said conveyer-trough communicates with the chamber of an inclined conveyer *s*, Figs. 3, 5 and 6, which discharges into a gold-receptacle *t* at top, where the richness or poverty of the spoil can be ascertained immediately by inspection from time to time, so that the operation of the dredge may be intelligently directed.

The drum *n* is driven from the line-shaft *k* through a pair of bevel-gears 52, a transverse shaft 53 having its bearings in the end-piece *g*, and a pair of bevel-gears 54, which latter transmit motion from said transverse shaft to the drum-shaft *o*; the conveyer *s* is driven from a sprocket-wheel 55, Fig. 6, on the line-shaft *k*, by a sprocket-chain 56 and a sprocket-shaft 57 at the upper end of the conveyer, and the conveyer *r* is driven from the lower sprocket-shaft of said conveyer *s* by spur-gearing 58.

A sluice *u*, Figs. 1, 2 and 3, extends from the chamber *p* of the gold-saving apparatus *G* to the stern of the boat, where it discharges into a chute *v*, Fig. 2, which carries the tailings farther to the rear. The floor 59 of the sluice *u* is provided with longitudinal corrugations, covered by removable riffles 60 having transverse inclined slats, and interrupted by mercury troughs 61 to catch any mercury and gold dust carried out of the chamber *p* by the rush of water and floating matter. A system of pipes 62, provided with check valves 62*, connects the troughs 61 with the chamber *p* so that the

accumulations therein may discharge into the main body of mercury, without endangering the loss of mercury from said chamber through such connections. The nozzles

5 63, Fig. 3, of said system of pipes is carried into the front end of the chamber *p* so as to utilize any siphoning effect at this point due to pumping the spoil into the drum *n*. The chute *v* is hinged to the stern of the
10 dredge at 64, and supported in effective position by guys. When the dredge is not at work the chute is turned on end, as shown at *v'*, Fig. 2, out of the way. The "spud" I, Fig. 2, may be of any known or improved
15 construction.

A pair or a gang of excavators and elevators *E* may be employed in place of one; the pipe *b* and screw *c* may be lengthened for deeper water by introducing additional
20 sections; the pump *d* may be provided with a hand-hole securely covered; the excavating elevating and gold-saving apparatus *E*, *F* and *G*, or portions thereof, may be mounted on cars for working dry placers; additional
25 electric motors and conductors may in some cases take the place of some of the shafting and gearing; and other like modifications and details will suggest themselves to those skilled in the art.

30 Having thus described said improvement, I claim as my invention and desire to patent under this specification:

1. The combination, substantially as here-
inbefore specified, of an excavator and ele-
35 vator, including a suction pipe, a pump in direct communication with said pipe for creating the suction, a gold saving apparatus containing a mercury bath, and a passage-forming hinge connecting said pump and
40 said gold saving apparatus and through which the spoil is discharged beneath the surface of the mercury by said pump.

2. The combination, substantially as here-
inbefore specified, of an excavator and ele-
45 vator including a suction pipe, a pump in direct communication with said pipe for creating the suction, a gold saving apparatus, and a passage forming hinge connection between said pump and said gold saving
50 apparatus through which the spoil is discharged into said gold saving apparatus by said pump.

3. The combination, substantially as here-
inbefore specified, of an excavator and ele-
55 vator including a suction pipe, a pump in direct communication with said pipe for creating the suction, a gold saving apparatus including a liquid bath, and a passage forming hinge connection between said
60 pump and said gold saving apparatus constructed and arranged to deliver the spoil into said gold saving apparatus beneath the surface of the liquid of said bath.

4. The combination, substantially as here-
65 inbefore specified, of an excavator and ele-

vator including a suction pipe, a pump in direct communication with said pipe for creating the suction, a gold saving apparatus including a liquid bath and a screen the top of which is submerged within said
70 bath, and a passage forming hinge connection between said pump and said gold saving apparatus constructed and arranged to deliver the soil beneath the submerged top of said screen.
75

5. The combination, substantially as here-
inbefore specified, of an excavator and ele-
vator including a suction pipe, a pump in direct communication with said pipe for creating the suction, a gold saving appa-
80 ratus including a liquid bath, a substantially horizontal rotary drum provided with concentrating screens the top of which is submerged beneath said bath and fixed screens at the sides of said drum, and a passage
85 forming hinge connection between said pump and said gold-saving apparatus constructed and arranged to deliver the spoil beneath the submerged top of said drum.

6. The combination, substantially as here-
inbefore specified, of an excavator and ele-
vator comprising a suction pipe and a rotary pump communicating therewith, a motor having a rotary shaft which carries the piston of said pump, a hinge-supported bed
90 frame common to said pump and motor, a gold-saving apparatus including a rotary drum into which said pump discharges, and mechanism transmitting motion from said shaft to the level of the axis of said hinge
95 and from said level to said drum.
100

7. The combination, substantially as here-
inbefore specified, of an excavator and ele-
vator comprising a suction pipe and a rotary pump communicating therewith, a motor
105 having a rotary shaft which carries the piston of said pump, a hinge-supported bed-frame common to said pump and motor, a gold-saving apparatus into which said pump discharges including conveyers for remov-
110 ing gold therefrom, and mechanism transmitting motion from said shaft to the level of the axis of said hinge and from said level to said conveyers.

8. The combination, substantially as here-
inbefore specified, of an excavator and ele-
vator comprising a suction pipe and a rotary pump communicating therewith, a motor having a rotary shaft which carries the piston of said pump, a hinge-supported bed-
120 frame common to said pump and motor, a gold-saving apparatus including a rotary drum into which said pump discharges, and mechanism including bevel-gearing transmitting motion from said shaft to the level
125 of the axis of said hinge and from said level to said drum.

9. The combination, substantially as here-
inbefore specified, of an excavator and ele-
vator comprising a suction pipe and a rotary
130

pump communicating therewith, a motor having a rotary shaft which carries the piston of said pump, a hinge-supported bed frame common to said pump and motor, a
5 gold-saving apparatus into which said pump discharges including conveyers for removing gold therefrom, and mechanism including

bevel-gearing transmitting motion from said shaft to the level of the axis of said hinge and from said level to said conveyers.

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Witnesses:

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