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ELEVATING POWER SHOVEL

Filed Dec. 23, 1930

FIG. 1.

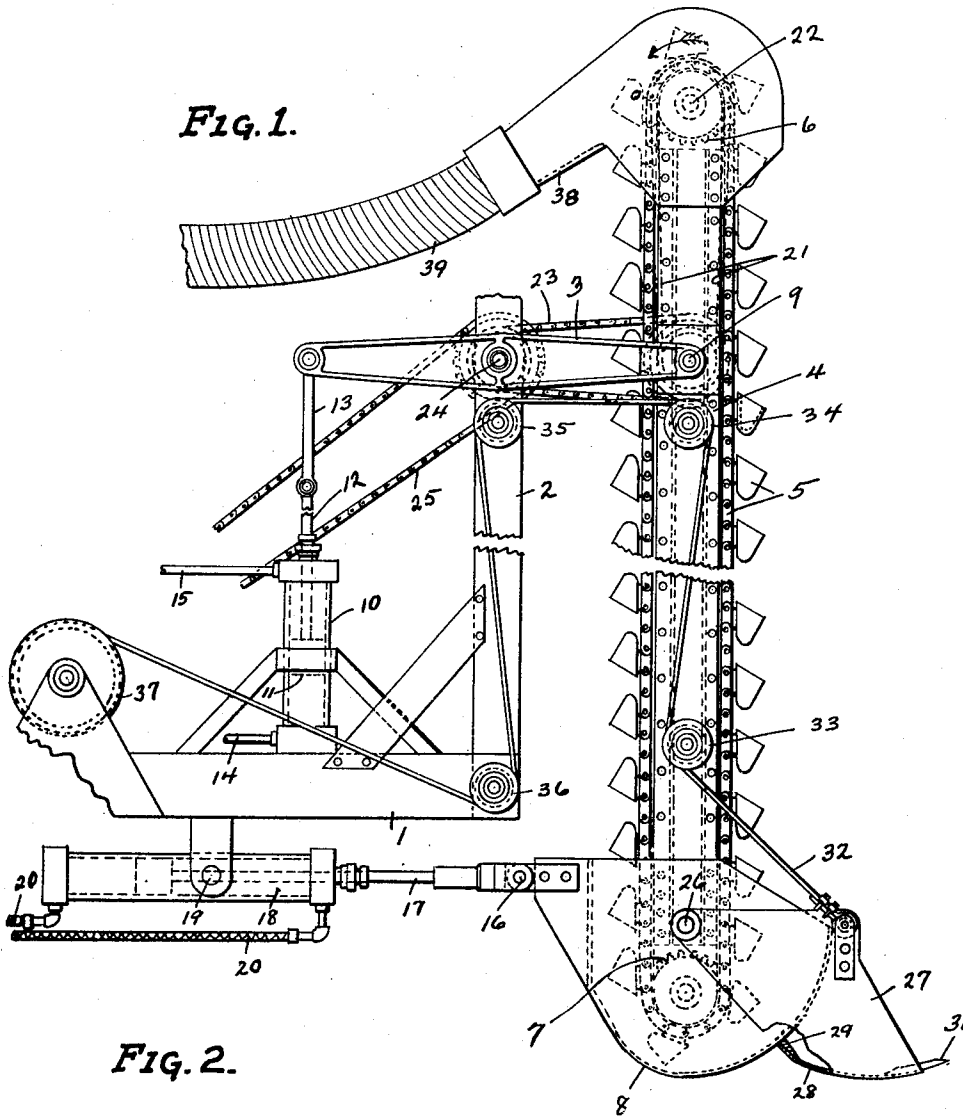
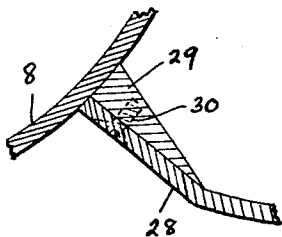


FIG. 2.



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ELEVATING POWER SHOVEL

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This invention relates to power shovels, and has for its objects a special construction of a portable shovel for digging sand and gravel in placer mining operations and for elevating the material for overhead discharge to concentrator tables. A particular object is such a construction which will avoid loss of gold or other heavy particles from the material being dug.

As the apparatus may be mounted on skids or on any type of movable vehicle frame not involved in the present invention the drawing shows only so much of the supporting structure as is necessary to make the operation of the invention clear.

In the drawing Fig. 1 is a side elevation of the apparatus with part of the digging bucket side broken away to show the wearing strip and gold retaining discharge edge.

Fig. 2 is an enlarged detail of the shovel wearing strip.

In further detail 1 is the extending end of any suitable frame as from a heavy wheeled vehicle not shown, and on which the apparatus is carried. Extending vertically on the end of the frame is a post or pair of posts 2 to the upper end of which is pivoted a pair of horizontally arranged rocker arms 3 which embrace at their forward ends an elevator leg or casing 4 in which is mounted an endless chain bucket elevator 5 which passes over head sprockets 6 and lower sprockets 7 in an elevator boot 8 surrounding the lower end of the leg 4.

Rocker arms 3 are pivoted at 9 to opposite sides of the leg 4 so that the entire elevator may be raised and lowered upon rocking of the arms, and which is positively controlled through means of an hydraulic cylinder 10 mounted on frame 1 and provided with a double acting piston dotted at 11, the piston rod 12 of which is pivotally connected by a connecting rod 13 to the inner ends of the rocker arms. Water or oil is positively forced to either end of the cylinder and released from the other by pipes 14 and 15 from a pump and suitable control valves not shown so that the piston is hydraulically locked at any point of elevation.

The rear end of the boot 8 has its side walls

extended rearwardly and is pivotally connected at 16 to a piston rod 17 of a second hydraulic cylinder 18 pivotally suspended at 19 from the under side of the frame in a manner to permit rocking upon forcing the piston rod in and out to move the lower end of the elevator forward or backward at different points of elevation as determined by cylinder 10.

Hydraulic power is supplied to opposite ends of cylinder 18 through flexible hose lines 20.

The bucket elevator in the leg 4 is operated by a chain drive 21 from head shaft 22 to a wheel concentric with rocker arm axis 9 and from there by a second drive 23 to a wheel concentric with pivotal axis 24 of rocker arm pivot, and from said axis by a drive 25 to any desired source of power carried on the frame 1 and not shown in the drawing.

The elevator boot 8 is provided with an arcuate lower front wall on a radius from a point 26 to which point at opposite sides of the boot is pivoted the rearwardly extending sides of a digging shovel 27 made of a size to fit over the outside of the boot and provided with a curved lower wall or bottom 28 cut out to fit fairly close to the arcuate bottom of boot 8 and provided with an angular plate 29 of wear-resisting metal removably held in place as by screws 30. Plate 29 being angular or wedge-shaped forms a gentle depression just preceding the discharge edge of the shovel so that as it is swung upwardly around axis 26 to discharge rearwardly into the boot any gold or other heavy metal particles will be lodged in front of the strip 29 so that it will not be lost by slipping into the crack between the boot and shovel but will be discharged into the boot when same is elevated sufficiently in dumping.

The shovel has suitable digging teeth 31 at its forward edge, and it is lowered for digging and raised to dump by means of a cable 32 running over several idler pulleys 33, 34, 35, 36 and thence to the drum 37 of a suitable power hoist controlled in the well known manner.

The elevator is run fast enough to discharge centrifugally into a chute 38 in turn discharging into a flexible conduit 39 for leading the material to any desired point of distribution.

By the construction described, the elevator and its shovel may be raised and lowered or projected forwardly and backwardly as desired to reach the gravel or sand from any position in line with the shovel, and when sufficient has been dug from along this line the whole apparatus is advanced on its frame in a direction at right angles to the plane of the drawing.

We claim:—

1. An elevating power shovel comprising a vertically arranged bucket elevator provided with a discharge chute at its upper end, means whereby said elevator may be swung bodily on a horizontal axis, a boot at the lower end of the elevator arranged to swing with the elevator, and a shovel carried by the boot arranged to discharge into the same.

2. An elevating power shovel comprising a vertically arranged bucket elevator provided with a discharge chute at its upper end, means whereby said elevator may be swung bodily on a horizontal axis, a boot at the lower end of the elevator arranged to swing with the elevator, and a shovel pivotally carried by the boot arranged to discharge into the same, and means for swinging the shovel on its pivot independently of the swinging of the elevator.

3. An elevating power shovel comprising a vertically arranged bucket elevator provided with a discharge chute at its upper end, means whereby said elevator may be swung bodily on a horizontal axis, a boot at the lower end of the elevator arranged to swing with the elevator means carried by the boot adapted for delivering material thereto, and means for bodily raising and lowering the elevator.

4. In a structure as specified in claim 1, the means for swinging the elevator comprising a hydraulically operated piston connected to the elevator structure.

5. In a structure as specified in claim 1, the means for swinging the elevator comprising a hydraulically operated piston connected to the elevator structure, and hydraulic means for positively operating the piston in both directions.

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