

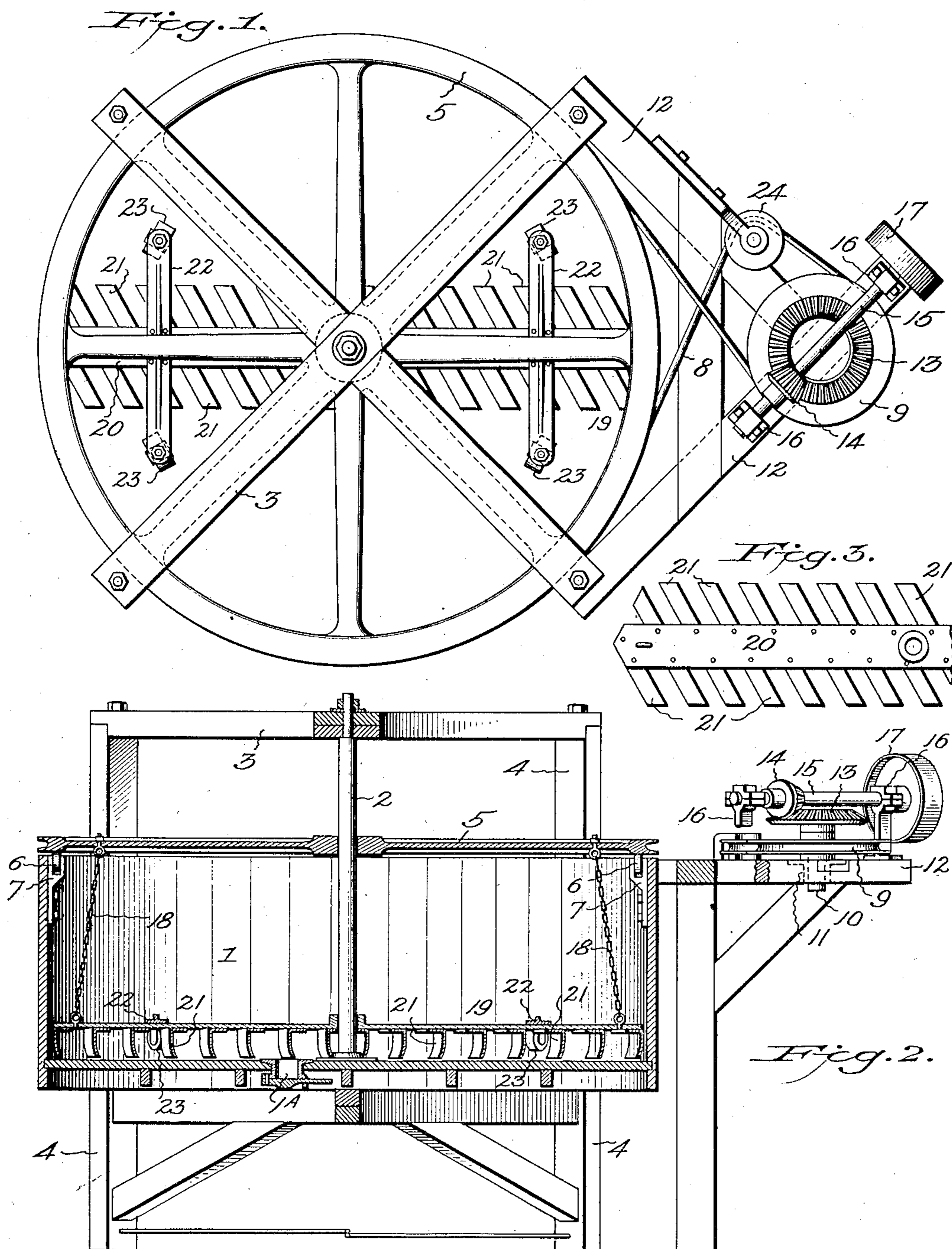
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J. C. & H. H. WINCHELL.

APPARATUS FOR AUTOMATICALLY DISCHARGING ORE PULP SANDS
AND OTHER MATERIAL FROM TANKS.

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APPARATUS FOR AUTOMATICALLY DISCHARGING ORE-PULP SANDS AND OTHER MATERIAL FROM TANKS.

No. 875,876.

Specification of Letters Patent.

Patented Jan. 7, 1908.

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To all whom it may concern:

Be it known that we, JEREMIAH C. WINCHELL and HOWARD H. WINCHELL, citizens of the United States of America, residing at Monte Vista, county of Rio Grande, and State of Colorado, have invented a new and useful Apparatus for Automatically Discharging Ore-Pulp Sands and other Materials from Tanks, of which the following is a specification.

My invention relates to a new device for automatically emptying ore pulp sands from cyanid tanks, and the objects of my invention are:—First, to provide an automatically operating scraper adapted to discharge ore sands and other materials from tanks. Second, to provide an automatically operating revoluble scraper adapted to be placed in cyanid tanks on top of the ore sands and to feed the sands to a centrally positioned discharge or aperture. Third, to provide an automatically operating scraper for emptying tanks of sands and other materials, which is adapted to be removably applied to tanks at the time they are to be discharged and removed from the tanks after their contents are discharged; and that is simple, inexpensive, easily and quickly applied, and thoroughly practical in its operation. I attain these objects by the mechanism illustrated in the accompanying drawings, in which:

Figure 1. is a plan view of a cyanid tank and of my invention. Fig. 2. is a vertical sectional view of Fig. 1. And Fig. 3. is a fragmentary view of the scraper bar and its plows applied thereto.

Similar letters of reference refer to similar parts throughout the several views.

Referring to the drawings, the numeral 1, designates a cyanid ore pulp sand holding tank, which is provided preferably with a flat bottom, but a concaved bottom may be used in the tank if desired.

1^A designates a valve discharge aperture in the bottom of the tank.

2, designates a vertical shaft which is journaled in the bottom of the tank at its lower end. The opposite end of the shaft is journaled in a spider 3, which is preferably removably attached to standards 4, which support the tank and project above its top edge. This shaft 2, is preferably a fixed shaft and upon it is rotatably mounted a sheave wheel 5. This sheave wheel is rotatably supported

at the edge of the tank by a plurality of rollers, 6 which are journaled on pins in brackets 7, which are secured to the top edge portion of the tank. This sheave wheel is connected by a belt 8, to a sheave pulley 9, which is mounted on a vertical shaft 10 that is supported in a box 11 which is secured to suitable supporting timbers, 12. A bevel gear wheel 13 is secured to the vertical shaft 10, above the sheave pulley, and a bevel pinion 14, is rotatably mounted in mesh with the bevel gear 13 on a shaft 15, which is journaled at right angles to the vertical shaft 10 in boxes, 16, which are secured to one of the supporting timbers 12. A belt pulley, 17 is secured to the shaft 15, which enables it to be connected by a belt to a suitable source of rotative power.

The tank sheave wheel comprises a hub portion and a felly portion, provided with a sheave tread for a belt, which may be either round or flat, and a plurality of radiating spokes, the spaces between which enable ore to be discharged from a hopper spout into the tank. The tank sheave wheel rotates loosely on the shaft 2, and rests loosely on the rollers at the edge of the tank, and it is therefore easily removed from the vertical shaft and from the tank. To the under side of this sheave preferably from two oppositely extending spokes, I secure the upper ends of two ropes or chains 18, the opposite ends of which are secured to the opposite or outer ends of a scraper 19. This scraper comprises a supporting bar 20, which is rotatably mounted on the center shaft of the tank and is of a length to fit loosely and rotatably within the tank, and it is arranged and adapted to be placed on the vertical shaft on top of the ore pulp sand in the tank when it is desired to empty the tank, and to be removed from the shaft of the tank after it has discharged the ore sands from the tank and it is consequently loosely enough mounted on the central vertical shaft of the tank to feed down the shaft as it rotates until it reaches the bottom of the tank. This scraper bar is provided at substantially equal distances apart throughout its length with a plurality of scrapers or plows 21, which consist preferably of right-angled bars or plates, one side of which may be formed integral with the scraper beam or be removably secured to it, while the other side depends ver-

tically from the scraper bar and forms a scraping blade. These scraper blades are arranged so that their forward moving ends will stand at a slight outward angle to the scraper bar or beam from the axial center of the beam and of the tank so that as the scraper bar and the scrapers rotate they will each draw the ore sands towards the axial center of the tank at each revolution a distance equal to their angularity to the radial plane of the scraper bar. The ropes or chains which connect the opposite end portions of the scrapers to the sheave wheel, should be of a length to permit the scrapers to descend to the bottom of the tank, as the sand is discharged.

In order to prevent the plows 21 from sinking or cutting too deep into the sand, while the machine is in operation, we secure adjacent to the outer ends of the bar 20 and at right angles thereto, bars or cross arms 22, to the outer ends of which broad faced wheels such as pulley wheels, are suitably attached, by means of hangers or brackets, and these wheels will contact with the surface of the sand, when the plows have cut to the required practical depth, and prevent their further entrance into the sand, the cutting edges of the plows being a suitable distance below the rollers.

To the supporting frame of the tank I secure a belt tightening idler pulley 24, which is rotatably mounted in a bracket that is adjustably and slidably secured to the supporting frame.

The operation of my improved ore-pulp sand discharging apparatus is as follows: In the treatment of cyanid ore pulp, which is finely ground or pulverized ore mixed with a cyanid water solution, the tank is filled about two-thirds full of dry pulverized ore from bins through a hopper that is positioned above the tank, and then the cyanid solution is turned into the tank until it appears above the ore. After standing until the cyanid solutions have dissolved the gold in the ore sands, the valve aperture 2 is opened and the ore sand and solution that is directly above the aperture runs out, leaving the great bulk of the ore sand in the tank, and as the solution runs out very rapidly the ore sand is left as a wet settled and packed sand. Heretofore it has been customary to discharge the tanks of cyanid mills by shoveling their contents out, which with tanks holding from about fifty to several hundred tons is expensive, and furthermore requires that the tanks be kept out of ore treating use for some time after each charge, but with my invention the tank can be emptied automatically in a very short time, and to empty a tank, the scraper is placed on the vertical shaft and rested on top of the ore sand within the tank. The large sheave wheel is then mounted on the

vertical shaft and rested on its rollers at the top edge of the tank. The belt is then connected to the large sheave and to the idler sheave, which is adjusted to tighten the belt, then the driving pulley is connected by a belt to a power shaft and pulley of the mill, and the driving shaft rotates the sheave pinion, the sheave pinion rotates the large tank sheave wheel, which through the medium of the ropes or chains rotates the scraper in the tank, and as the scraper rotates its plow blades draw the sands into the axial center portion of the tank, where it flows readily down and out through the valve discharge aperture, and as the ore sand is discharged the scraper feeds down the vertical shaft until it has discharged all of the sand from the tank and rests on its bottom. The large sheave wheel if desired may be left on the tank and the scraper bar may be raised up underneath it and be secured to it. The tank is then refilled with ore sand through the spokes of the sheave, and with cyanid solution. In cyanid mills having a number of tanks each tank could be fitted up with the driving shaft and sheave pinion, and the rollers at the edge of the tank, and but one or two sets of the large sheave wheels and the scrapers need be used, as they are in use only when emptying tanks; consequently, the applying and emptying of the charges can be regulated to change these parts from one tank to another.

Our invention is simple, inexpensive to make, reliable in operation, and thoroughly practical.

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

1. An automatic ore-sand discharger for cyanid tanks, comprising a tank, a shaft in the center of said tank, a closable discharge aperture in the bottom of said tank, a scraper pivotally and slidably mounted on said shaft within said tank, a rotating sheave rotatably mounted on said shaft, and connected to said scraper by a flexible scraper rotating connection, and means for rotating said sheave.

2. An automatic sand or other material discharging apparatus for cyanid and other tanks, comprising a tank provided with a vertical axial shaft and a closable discharge aperture at the central portion of its bottom, a scraper pivotally and slidably mounted to rotate on said shaft, a power-driven wheel rotatably mounted on said shaft, a flexible connection between said power-driven wheel and said scraper arranged to permit said power-driven wheel to drag said scraper rotatably in said tank and to permit said scraper to feed from the top of said tank to its bottom, and means for rotating said power-driven wheel.

3. An automatic sand or other material

discharging apparatus for tanks, comprising the combination of a tank provided with a central shaft, and a valve discharge aperture at its central bottom portion, a sand scraper 5 comprising a plurality of plows coöperatively arranged to move the sand towards the center of the tank, said scraper being pivotally and slidably mounted on said shaft, a power transmitting wheel rotatably mounted above 10 said scraper and provided with flexible connections operatively attached to said scraper and adapted to permit said scraper to be rotatably dragged around in said tank by said power-transmitting wheel and to move slid- 15 ably on said shaft from the top of said tank to its bottom, and means for rotating said power-transmitting wheel.

4. In an automatically operating ore-sand or other material discharging apparatus for 20 tanks, the combination of the tank provided with the central vertical shaft and the valve controlled discharge aperture, a suitable supporting frame for said tank, and a spider removably secured to said tank's supporting 25 frame, and arranged to support the upper end of said tank's center shaft, with the scraper pivotally and revolubly and slidably mounted on said shaft within said tank, a large sheave wheel mounted on said shaft 30 below said spider, a plurality of power-transmitting wheels revolubly journaled adjacent to said tank, belt connections between said power transmitting wheels and said large sheave wheel, and flexible connec- 35 tions secured to the opposite sides of said sheave wheel and to the opposite ends of said scraper, and means for rotating said power transmitting wheels.

5. In an automatic material discharging 40 apparatus for tanks, the combination with the tank, the shaft in said tank, the central discharge aperture in said tank, and the tank's supporting frame, of a scraper rotatably mounted on said shaft, comprising a 45 bar pivotally and rotatably mounted on said shaft and extending diametrically across the inside of said tank, a plurality of plow blades depending from said bar, said plow blades being set at an angle adapted to progress- 50 ively move the material within the tank throughout its area towards the center of said tank as said scraper rotates, a sheave revolubly supported at the top edge of said tank, cables extending from said sheave to said 55 scraper and arranged to revolve said scraper in said tank, and a power transmitting belt connected and adapted to rotate said sheave.

6. In an automatic material discharging apparatus for tanks, the combination of a 60 tank provided with a central shaft, and a centrally located valved discharge aperture, of a suitable supporting frame for said tank, provided with standards extending above said frame, a spider removably secured to 65 said frame and secured to the upper end of

said tank's shaft, a plurality of rollers mounted on the edge of said tank, a sheave wheel pivotally mounted on said shaft and seated on said rollers, a scraper pivotally mounted on said shaft to rotate within said 70 tank, a pair of ropes secured at one end to the opposite side of said sheave, and connected at their opposite ends to the opposite end portions of said scraper, said scrapers comprising a supporting base pivotally 75 mounted on said shaft intermediate of its ends, and provided with a plurality of material moving plows or blades of any suitable character, arranged and adapted to move material progressively from the outer cir- 80 cumference of said tank and throughout its area towards and to its central portion in the plane of said tank's discharge aperture, a sheave supported adjacent to said tank, a belt extending from said sheave to said tank's 85 sheave, and means including a power driven shaft for imparting power to said sheave and belt to rotate said tank's sheave and scraper.

7. In an automatic ore-sand or other material discharging apparatus for cyanid or 90 other tanks, the combination of the tank, a fixed shaft vertically supported in the axial center of said tank, a valve controlled discharge aperture in the central portion of said tank, a plurality of rollers secured to the 95 top edge of said tank, a sheave or other power transmitting wheel rotatably and removably mounted on said rollers and axial shaft, a scraper removably, rotatably, and slidably journaled in said tank on said shaft, said 100 scraper comprising a plurality of plows, blades of any suitable form arranged to stand at an angle to the rotative path of said scraper in said tank that will move the ore sand or other material in said tank through- 105 out its area continuously towards the center of the tank and in the discharging path of said discharging aperture, drag ropes, secured at one of their ends to the opposite end portions of said sheave and connected at 110 their opposite ends to opposite end portions of said scraper.

8. In an automatic ore-sand or other material discharging apparatus for tanks, the combination of the tank provided with a 115 discharge aperture, the vertical fixed shaft secured at its lower end to the bottom of said tank at its center, the supporting frame projecting above said tank, the spider removably secured to said frame and arranged to 120 support the upper end of said shaft, and the rollers revolubly secured to the top edge of said tank, with a belt driven sheave wheel pivotally mounted on said shaft and arranged to rotatably roll on said tank's roll- 125 ers, a driving wheel journaled in said tank's supporting frame adjacent to said tank's sheave wheel, a belt arranged to connect said sheaves together, an adjustable idler sheave operatively attached to said tank's support- 130

ing frame in operative relation to said belt, means including a power transmitting shaft and gearing for imparting a rotative movement to said driving sheave, a multiple plow
5 scraper rotatably and vertically slidably mounted on said tank's shaft, comprising a supporting bar pivotally journaled intermediate of its ends on said shaft to move vertically from the top to the bottom of said
10 tank and adapted to extend from said shaft in opposite directions to the inner wall of said tank, and to rotate freely therein, and provided with a plurality of angularly arranged depending plow blades of any suitable form arranged and adapted to move the
15 contents of said tank progressively towards its central portion and in the discharging path of said tank's discharge aperture, and a pair of ropes or chain cables secured at one of their
20 ends to the opposite end portions of said

scraper and secured at their opposite ends to portions of said tank's sheave.

9. In a machine of the character specified, the combination with a tank having a valved outlet, of a shaft mounted vertically therein; 25 a sheave wheel loosely mounted on said shaft and supported upon rollers secured to the tank; a bar loosely mounted on said shaft, and suspended from said sheave wheel by flexible connections; plows on said bar set at
30 an angle thereto, means for limiting the depth of cut of said plows; and means for rotating said sheave wheel.

In testimony whereof we affix our signatures in presence of two witnesses.

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Witnesses:

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