No. 872,130. PATENTED NOV. 26, 1907.

H. T. HELGESON.

GRAIN CLEANING AND PICKLING MACHINE.

APPLICATION FILED NOV. 1, 1906.

3 SHEETS—SHEET 1.

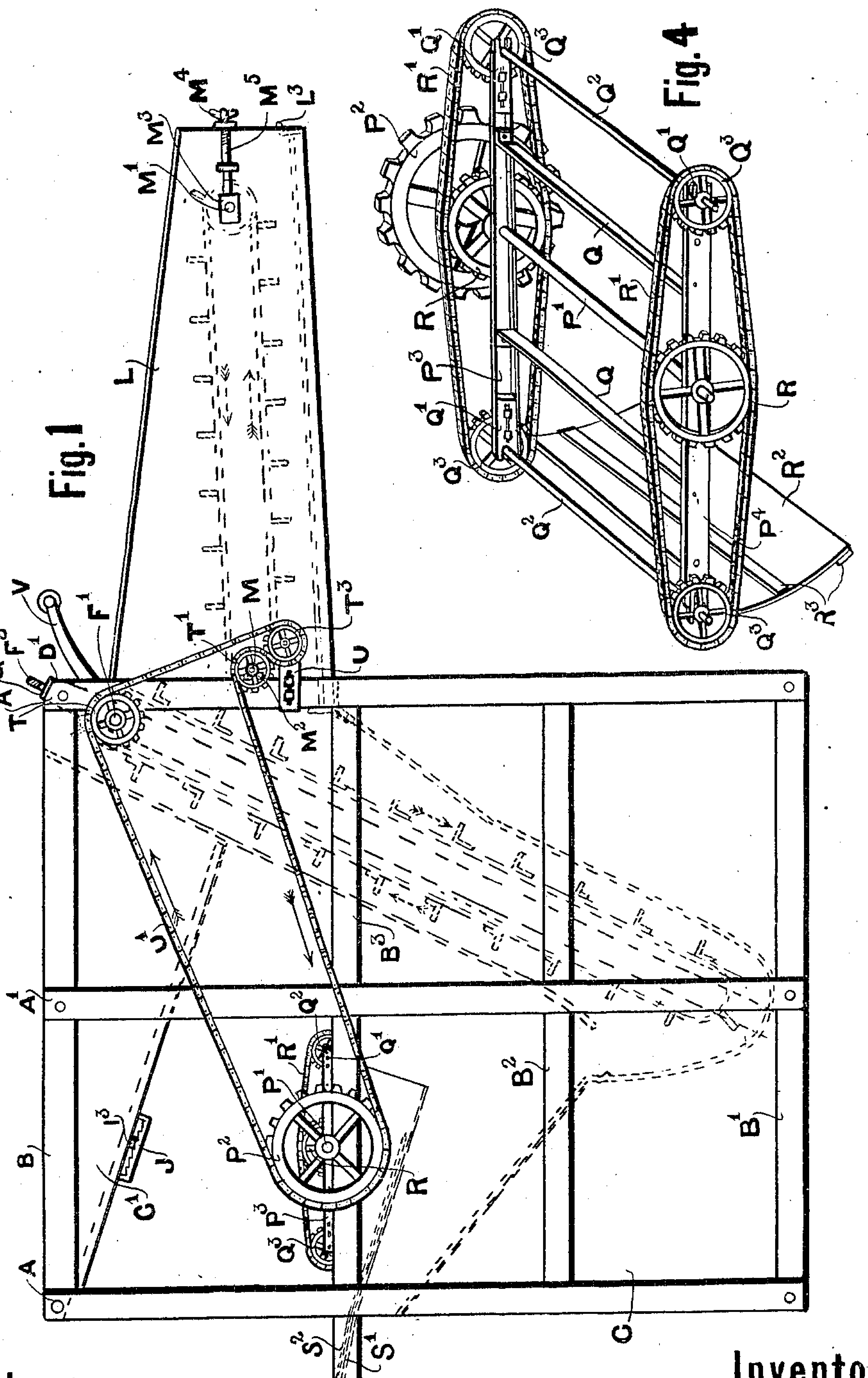

Fig.1

Fig.4

Witnesses.

Gerald S. Roxburgh

Jas. M. Tapley

Inventor

H. T. Helgeson

By [illegible]

His Atty

THE NORRIS PETERS CO., WASHINGTON, D. C.

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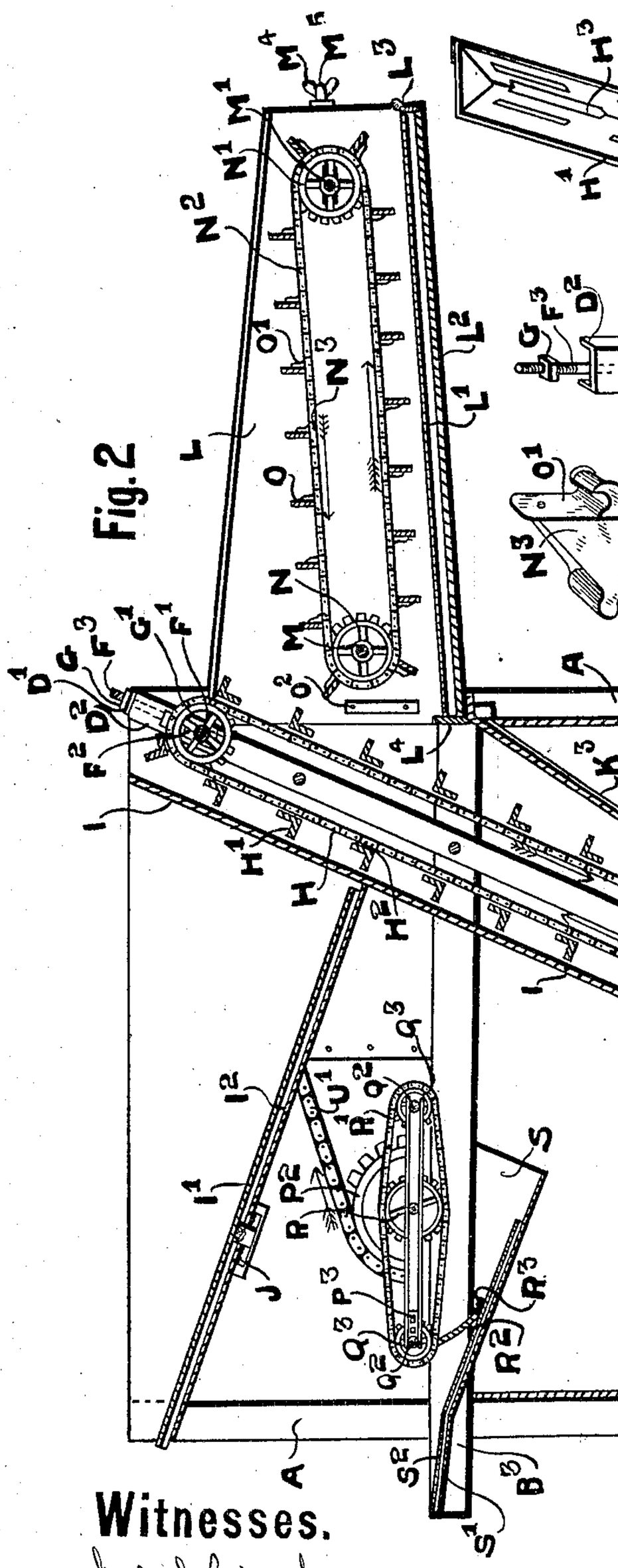

Fig. 2

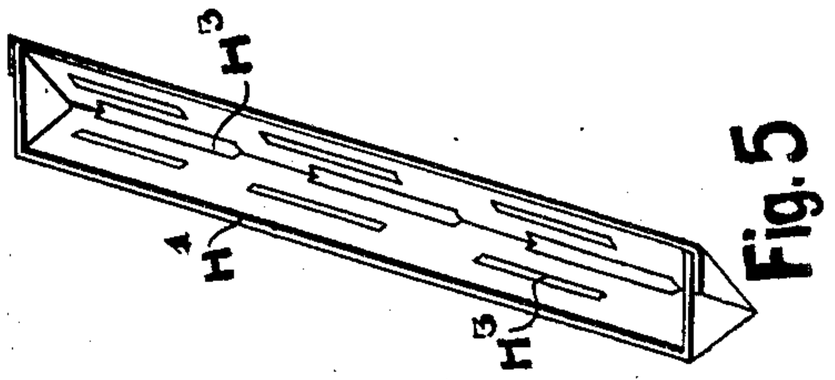

Fig. 5

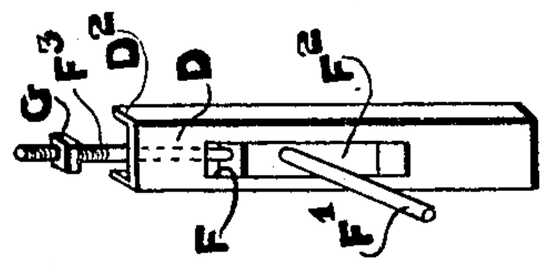

Fig. 8

Fig. 6

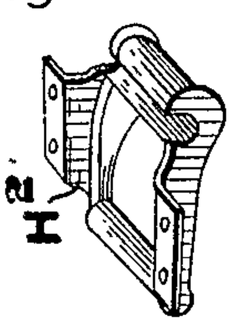

Fig. 7

Witnesses.

Gerald S. Foxbrough

Jas M. Tapley

Inventor

H. T. Helgeson

By Fred B. Fahnestock His Atty

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3 SHEETS—SHEET 3.

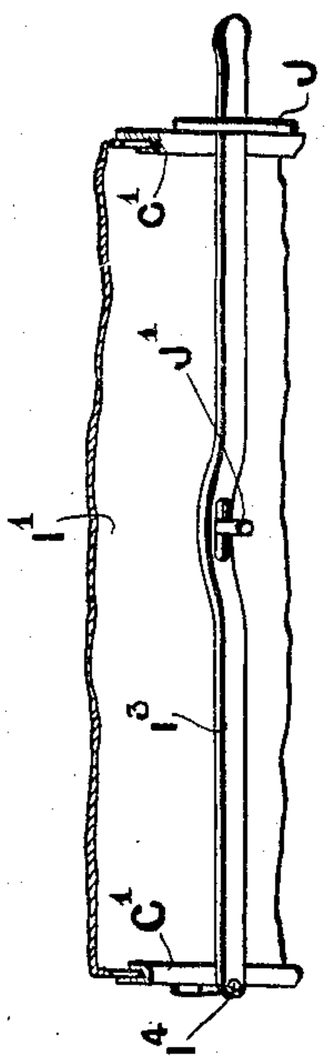

Fig. 9

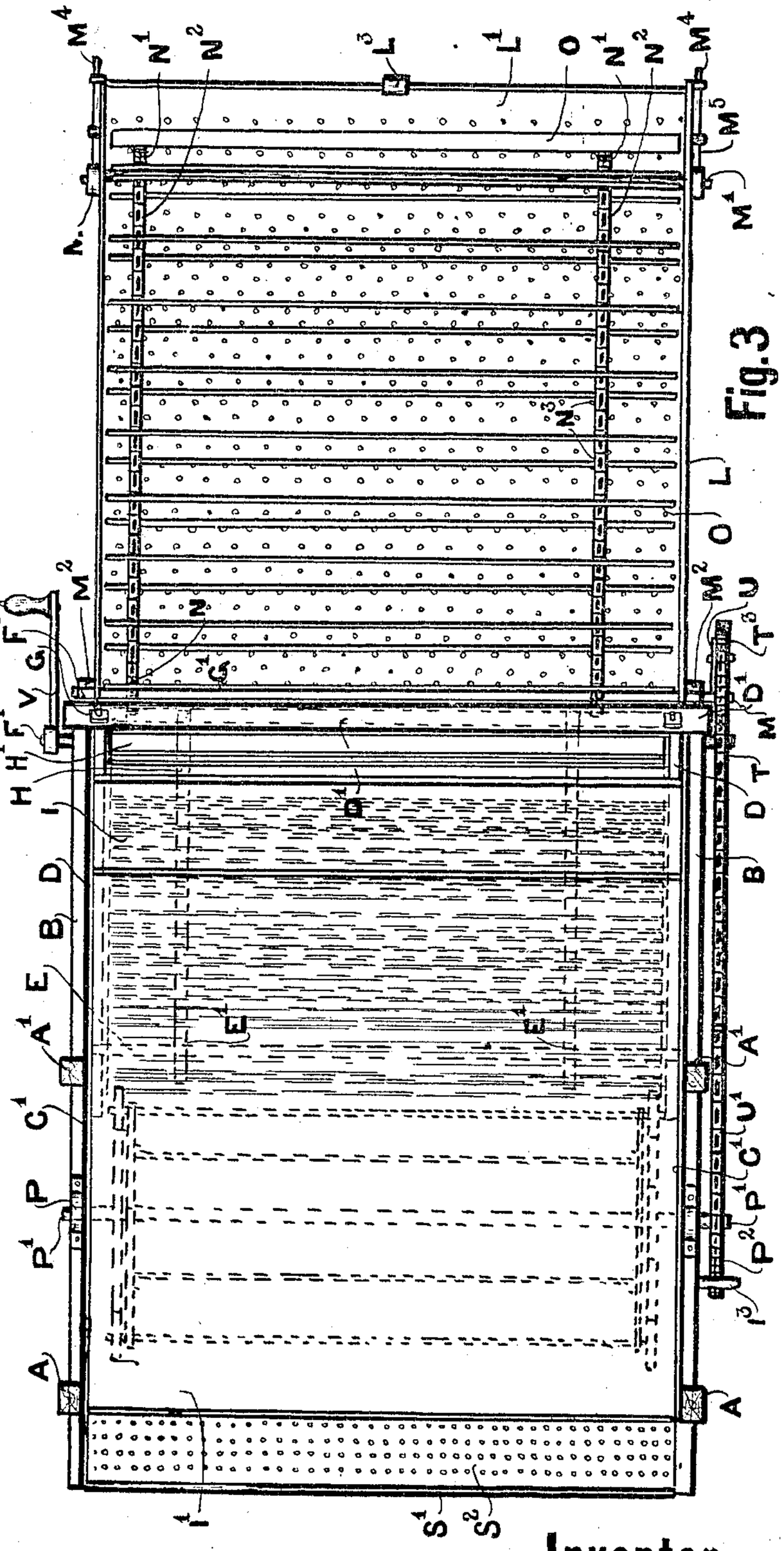

Fig. 3

Witnesses.

Gerald S. Roxburgh.

Jas. M. Tapley.

Inventor

H. T. Helgeson.

By Fred B. Fahnestock His Atty.

UNITED STATES PATENT OFFICE.

HALVOR T. HELGESON, OF REGINA, SASKATCHEWAN, CANADA.

GRAIN CLEANING AND PICKLING MACHINE.

No. 872,130. Specification of Letters Patent. Patented Nov. 26, 1907.

Application filed November 1, 1906. Serial No. 341,587.

To all whom it may concern:

Be it known that I, HALVOR T. HELGESON, of the city of Regina, in the Province of Saskatchewan, Canada, agent, have invented certain new and useful Improvements in Grain Cleaning and Pickling Machines, of which the following is the specification.

My invention relates to grain cleaning and pickling machines, and the objects of the invention are, firstly, to provide a machine in which the grain is completely immersed in the solution, secondly, to provide a skimmer for drawing off the floating impurities, thirdly, to provide means whereby the grain may be partially drained during elevation from the solution, and fourthly, to provide a screen to receive the elevated grain, and allow it to completely drain before being thrown from the machine, and it consists essentially of a tank containing the pickling liquid, endless carriers for raising the immersed grain from the solution, a hopper, a chute from the hopper and passing into the solution above the upper side of the carriers, an inclined projecting chute to receive the elevated grain, an endless conveyer in the chute, a draining board below the conveyer, and covering the base of the chute, a self adjusting skimmer, means for directing the immersed grain to the carriers, and means by which the liquid drained from the grain is returned to the tank, all arranged and constructed as hereinafter more particularly described.

Figure 1 is a side elevation of my complete invention. Fig. 2 is a vertical, cross sectional view, longitudinally through the center of the machine. Fig. 3 is a plan view of the machine. Fig. 4 is an enlarged, detailed, perspective view of the skimming attachment. Fig. 5 is an enlarged, detailed, perspective view of one of the cups on the carriers. Fig. 6 is an enlarged, detailed, perspective view of one of the links of the chain used in the conveyer, for supporting the flights. Fig. 7 is an enlarged, detailed, perspective view of the link of the chain used in the carrier for supporting the cups. Fig. 8 is an enlarged, detailed, perspective view of the bearing for the upper endless carrier shaft and the method employed for its adjustment. Fig. 9 is a perspective view of the lever controlling the feed from the hopper, and a portion of the hopper.

In the drawings like letters of reference indicate corresponding parts in each figure.

A A^1 are corner and side vertical uprights, and B B^1 B^2 B^3 B^4 are the top, bottom, and two central cross bars, forming substantially the framework of the machine.

C is a metallic casing, fitting within the framework, and secured thereto. The casing extends upwardly to the upper central cross bar B^3 and forms a rectangular tank in which the pickling solution is placed. Above the cross bar B^3 the casing forms side pieces C^1 adjacent to the ends of the conveyer, which are the sides of the hopper.

D are channel bars, secured to the inner faces of the casing and pass obliquely down the sides, extending to the bottom.

D^1 is a plate extending across the front of the machine, and over the upper ends of the channel bars. The channel bars are placed with their arms D^2 next the casing, in order to allow for the bearings of the carriers, as explained hereinafter.

E is a shaft passing transversely across the tank, and bears at its ends within journals formed in the lower ends of the channel bars D, in this way avoiding any leakage which would be occasioned if the shaft were otherwise journaled in the sides of the tank.

E^1 are a set of chain gears secured, one on either side, on the shaft E.

The channel bars have longitudinal openings F towards their upper extremities, through which the ends of the upper shaft F^1 pass.

F^2 are bearings for the shaft, slidable within the guideway formed by the channel bar and the face of the tank, and F^3 are rods passing upwardly from the bearings, through the cross bar D^1. The rods are threaded towards their upper ends, and provided with a nut G, by which the position of the bearing can be regulated.

G^1 are chain gears, one at each side, on the shaft F^1, and are in alinement with the lower wheels E^1.

H are endless sprocket chains, one on each side, passing around the opposing pair of chain wheels. Within the chains are links H^2, of the form shown in Fig. 7, suitably disposed, there being an equal number of such links in each chain, and directly opposing in position.

H^1 are a series of cups, of a trough shape, and are formed from a single sheet of metal, stamped with elongated perforations H^3 therein, and bent to the shape shown. I prefer to have the elongated perforations, but

any other form may be used, such as circular, etc., the requirements being that the openings allow a quick drainage from the cup, without being subjected to clogging or filling over. To each opposing pair of links (as shown in Fig. 7) I attach a cup, which is in length just sufficient to allow it to clear between the channel bars, in the rotation of the chains. It will be noticed that when in position, the slant of the chains, allows that the trough may be completely filled with grain, and retain it throughout the elevation.

I is a cross partition within the casing, extending downwardly from the top, well into the solution, and directly above the tips of the cups on the ascending side of the carriers.

I^1 is a sliding gate, supported from an inturned flange I^2 on the casing C^1. The gate closes at its lower end with the partition I, and in this way the upper part of the partition, the sides C^1 of the casing, and the gate I^1 form a hopper for primarily receiving the grain. The gate is adjusted by means of a lever I^3 pivoted at one end at I^4 to the side of the casing. The outer extremity of the lever passes into a toothed bar J suspended from the opposing side of the casing. Centrally a pin J^1 extends from the gate into a slot in the lever, thus by throwing the outer end of the lever, the gate can be moved and retained in any set position by the edge of the lever bearing against the teeth in the bar.

K is a partition extending totally within the pickling solution, and passes across within the casing, being bent centrally at K^1, to form a basin, around the lower extremity of the endless carrier. Continuing, the partition passes upwardly and forwardly at K^2 to the surface of the solution, at the end of the casing. Although this partition practically makes a division in the tank, yet its edges clear the sides, sufficiently to allow for a circulation on either side.

K^3 are a set of bands following the contour of the partition K, reinforcing it, and are placed toward the edges of the partition.

The cross partition I insures complete submersion of the grain passing from the hopper, and at the lower tip of the partition, being bent outwardly, it deflects the grain through the liquid to the basin K^1, and it is preferable that the basin extend upwardly, high enough, so that all the grain coming from the partition I, must pass to the cups on the carrier.

L is a chute projecting from the framework, and extending completely across, the rear end being designed to receive the grain thrown down or deposited by the cups. The chute is supported on its bottom face, by one of the cross strips, and the side faces are secured to the vertical members of the frame. The side faces are high and the base of the chute is inclined from the outer end towards the framework, in order to allow a backward drainage of liquid to the tank, it being understood that the inner end of the chute opens, practically in alinement, with the top of the tank. In event of the liquid being low in the tank, the drainage from the bottom of the chute, would pass over the upper end K^2 of the cross partition K, and back into the solution.

L^1 is a draining board or pan, fitting over the entire face of the bottom of the chute, and has its edges L^2 flanged downwardly, supporting the body clear of the bottom of the chute. The draining board is perforated throughout its length, and has a lip or strap L^3 secured centrally at its outer end to lift it from position. A lip L^4 extends upwardly from the bottom of the chute, and limits the inner position of the draining board.

M M^1 are rear and forward shafts, extending across the chute. The rear shaft M is journaled in stationary bearings M^2 secured on the corner uprights of the frame, and the forward shaft M^1 is retained in bearings M^3, which may be adjusted by means of the winged nut M^4, on the rod M^5 secured to the bearing. Any desirable form of adjustable bearings may be used for the shaft M^1, and I do not wish to restrict myself to that shown in the drawings.

N N^1 are chain wheels secured respectively in pairs, on the shafts M M^1, one at either side.

N^2 are endless sprocket chains, passing around the opposing pair of wheels, and having, suitably inserted, opposing links N^3, of the form shown in Fig. 6.

O are flights or blades, secured to the vertical arms O^1, of the opposing links N^3 and are in length practically the width of the chute. The positions of the shafts M M^1 are such that the chains of the conveyer are substantially parallel with the draining board L^1, and are so placed that the tips of the blades pass a considerable distance, (*i. e.*, about two inches) above the draining board.

O^2 is a partition extending across the chute, and prevents the grain from falling back into the tank, when it is thrown down from the cups.

P are bearings on either side of the frame, and supported on the upper central side partition B^3.

P^1 is a shaft journaled in the bearings, and passing across the top of the tank, and having at its one extremity, a large chain gear P^2 which extends completely outside of the casing. P^3 P^4 are similar bars, supported from the shaft P^1 and extending parallel with and within the inner face of the casing, one at either side.

Q are reinforcing bars, secured to the bars P^3, laterally, one on either side of the shaft.

Q^1 are adjustable bearings at the ends of the bars P^3, and support shafts Q^2, to which are secured chain wheels Q^3, at their extremities, the said chain wheels being free to rotate clear of the outer face of the bars.

R are chain wheels rotating within the shaft P^1, and in alinement with the wheels Q^3.

R^1 are endless gear chains, passing over the opposing sets of alined wheels. The rotation of the gear P^2 rotates the shaft, and consequently the gear chains R^1.

R^2 is a flap secured on a set of opposing links in the chain, at its upper edge, the links being of the form shown in Fig. 6. The flap is the full width between the chains, and is of rectangular shape. Strips of zinc or other metal R^3 are secured on the flap to give it weight and strength, and the material of the flap itself is, preferably, of a resilient nature. The flap rotates with the chains, and it is desirable, when it is on the upper side of the frame, that it remain extending, and not drop with its outer edge lying on the chains. It is to be noticed that the shaft P^1 is nearer the inner end of the bars, *i. e.*, toward the carriers, than it is towards the outer end. This is done, in order that the weight of the flap, will not cause the inner end of the bars P^3 to drop suddenly when the flap is approaching the inner limit, that is, the extra weight of the arms on the outer end, is about balanced by the flap, when it is at the inner end. Below the flap, supported from the sides of the casing, and extending obliquely into the liquid in the tank, is a pan S. The width of the pan is the full width of the tank, and the upper end S^1, extends rearwardly behind the corner uprights, the outer end being supported by the projecting ends of the central cross bar B^3.

S^2 is a screen or sieve, covering the entire top of the pan and is removable.

T is a gear wheel, on the outer end of the shaft F^1, on the same side as the gear P^2, and in alinement therewith.

T^1 is a gear wheel at the outer end of the shaft M, and T^3 is a gear wheel, slightly below that T^1, and supported by an adjustable bearing U, dependent from the face of the upright A.

U^1 is a chain passing over the wheel T, around the gear T^3, over the gear T^1, and around the gear P^2. The gear T^3 is an idler, for giving a different rotation to the gear T^1, than has the gear T, and it also provides a simple means for tightening or loosening the chain,

V is an operating handle, secured to the shaft F^1 at the other extremity of the shaft from the gear T.

The operation of the machine is as follows:—The grain is placed in the hopper and fed to the pickling solution, through the gate I^1. In passing from the hopper, it is carried on the cross partition I, into the solution in the tank C, and then clears over the end of the partition, and is deflected to the side of the basin, where it tends to drop and collect at the bottom. The rotation of the carriers, (as shown by the arrow in the drawings) scoops the grain into the cups, and it is lifted from the solution, and carried over the tops of the shaft F^1, and thrown down into the inner end of the chute. The design of the cups, allows the grain to drain immediately it leaves the solution. Shortly after the machine has been running, the face of the draining board L^1 is completely covered with grain, for a thickness of, or about, two inches, which is practically till it reaches the tips of the carriers O. When more grain is thrown down by the carriers, it is caught by the blades O^1, and carried or shoved towards the outer end of the chute. However a great deal of it intermingles with the grain already on the draining board, and a portion of that which has been there some time, is thrown off the outer end of the chute. In this way the greater portion of the grain, deposited from the carriers unto the chute, remains on the draining board a considerably longer space of time than that necessary for an individual blade to pass the length of the chute. Moreover the shaft M^1 being somewhat in from the end, allows the grain to collect or bank up at the lower end, on the draining board, and gradually drop off. The grain is, in this manner, drawn through a bed of similar grain, and the solution passes through the drain board unto the bottom of the chute, and passes back into the tank, due to the inclination of the chute. The bed of grain also prevents the openings in the drain board, from clogging or filling up, and gives the grain a great deal better chance to drain, than would be allowed if the blades of the conveyer swept the grain directly over the drain board. In this latter case, the openings would quickly become clogged, and the passage would be so quick that time would not be allowed for all the liquid to drain off.

The skimmer is composed of the suspended side bars P^3, the endless chains, and the flap. It is operated by the gear wheel P^2 which rotates the chains, and consequently the flap. The width of the flap is such that it will extend some distance into the solution. When the tank is full, all the impurities, such as smut balls, oats, and noxious seeds, which float on the surface, are caught by the flap, when it strikes the surface of the liquid, at the inner end of its travel, and are carried rearwardly, till they are forced up the screen S^2, and there deposited, clear of the solution, the flap continuing its travel. They remain on the screen until the flap again returns and deposits more impurities. These tend to shove the impurities, first deposited, over the rear end of the screen. In this way the impurities drawn off, have time to drain through the screen, and the solution is carried back into the tank by means of a pan S. The skimmer, being pivoted on the shaft P^1, allows the flap to adjust itself to the height of the solution in the tank, that is, when the

flap is approaching the inner end, it will cause the end to drop till the flap strikes the surface of the solution. However it is not absolutely necessary that the skimmer be pivotally supported, as it could be made stationary, with the width of the flap sufficient to reach the surface of the solution, when the liquid is at its least depth.

Although I use channel bars to support the shafts of the endless carrier, yet other means may be employed which would prevent the necessity of having to pivot the shafts in the sides of the tank. In connection with the channel bars, it is further pointed out that they are not secured to the tank, but are secured to the framework above the level of the liquid.

What I claim as my invention is:

1. A device of the class described, comprising a feed hopper, a tank, a funnel-shaped cross partition within the tank and extending from one side thereof to the other and from end to end, an endless carrier extending into the channel, formed by the funnel-shaped partition, and a chute leading from the hopper, and extending into the tank and above the carrier, and adapted to direct the grain into the funnel-shaped channel, as and for the purpose specified.

2. A device of the class described, comprising a tank, having a cross partition, forming a funnel-shaped channel with the sides, an endless conveyer having its lower end within the channel, a cross partition extending obliquely downwardly above the ascending side of the conveyer, an adjustable gate making an angle with the latter cross partition, and forming with the latter cross partition a hopper, as and for the purpose specified.

3. In a device of the class described, the combination with the supporting frame, of a tank in the lower portion of the frame, an endless carrier extending obliquely from the tank and within the framework, side inclosures at the ends of the carriers, and continuous with the sides of the tank, a cross partition in the tank, forming a basin with the side of the tank, an endless carrier extending obliquely upwardly from the basin, out of the tank and within the framework, a cross partition above the ascending side of the carrier and extending into the tank, an adjustable gate, forming with the latter cross partition and the side inclosures, a hopper, as and for the purpose specified.

4. In a device of the class described, the combination with the tank, the hopper and the endless carriers, of an inclined chute having its inner end connected with the tank above the endless carriers and adapted to receive the grain therefrom, an endless chain conveyer longitudinally within the chute, and having blades thereon, extending across the chute, a drain board below the tips of the blades on the lower side of the conveyer, and a cross partition adjacent to the inner end of the conveyer, as and for the purpose specified.

5. In a device of the class described, the combination with the tank, and the endless carrier, of a chute inclined towards the tank and having its inner end connected thereto, and adapted to receive the grain from the carriers, a set of gears supported on a shaft bearing in the sides of the inner end of the chute, a set of gear wheels secured on a shaft, supported in adjustable bearings at the sides of the outer end of the chute, endless gear chains encircling the opposing gears in the sets, a series of cross blades secured to the chains, and extending to the edges of the chute, a cross partition at the inner end of the chute, in juxtaposition to the conveyer, a perforated drain board extending across the chute, and considerably below the tips of the blades, as and for the purpose specified.

6. In a device of the class described, a skimmer consisting of a framework, transverse shafts, supported in adjustable bearings at the extremities of the framework, a substantially central supporting shaft passing through the framework and between the aforementioned shafts, chain gears at the extremities of the shafts, endless chains passing around the gears, a flap secured to opposing links in the chains, and means for operating the chains, as and for the purpose specified.

7. In a device of the class described, the combination with the supporting frame of a tank, in the lower portion of the frame, side inclosures at the upper portion of the frame, bars supported by the inclosures and extending obliquely into the tank, a transverse shaft pivotally supported in the lower end of the bars, a transverse shaft pivotally supported in adjustable bearings at the upper end of the bars, sets of similar gear wheels on the shafts, endless link chains encircling the gears, a series of suitably disposed perforated cups secured to the chains, a cross partition passing downwardly into the tank, and above the tips of the cups on the ascending sides of the chains, a cross partition forming a basin with the sides of the tank, and adapted to direct the grain to the carriers, an adjustable gate supported by the side inclosures, and making an angle with the former partition, an inclined chute projecting from the framework and adapted to receive the grain from the cups, a drain board in the chute, and a longitudinal conveyer above the drain board, as and for the purpose specified.

HALVOR T. HELGESON.

Witnesses:

M. A. SOMERVILLE,

GERALD S. ROXBURGH.