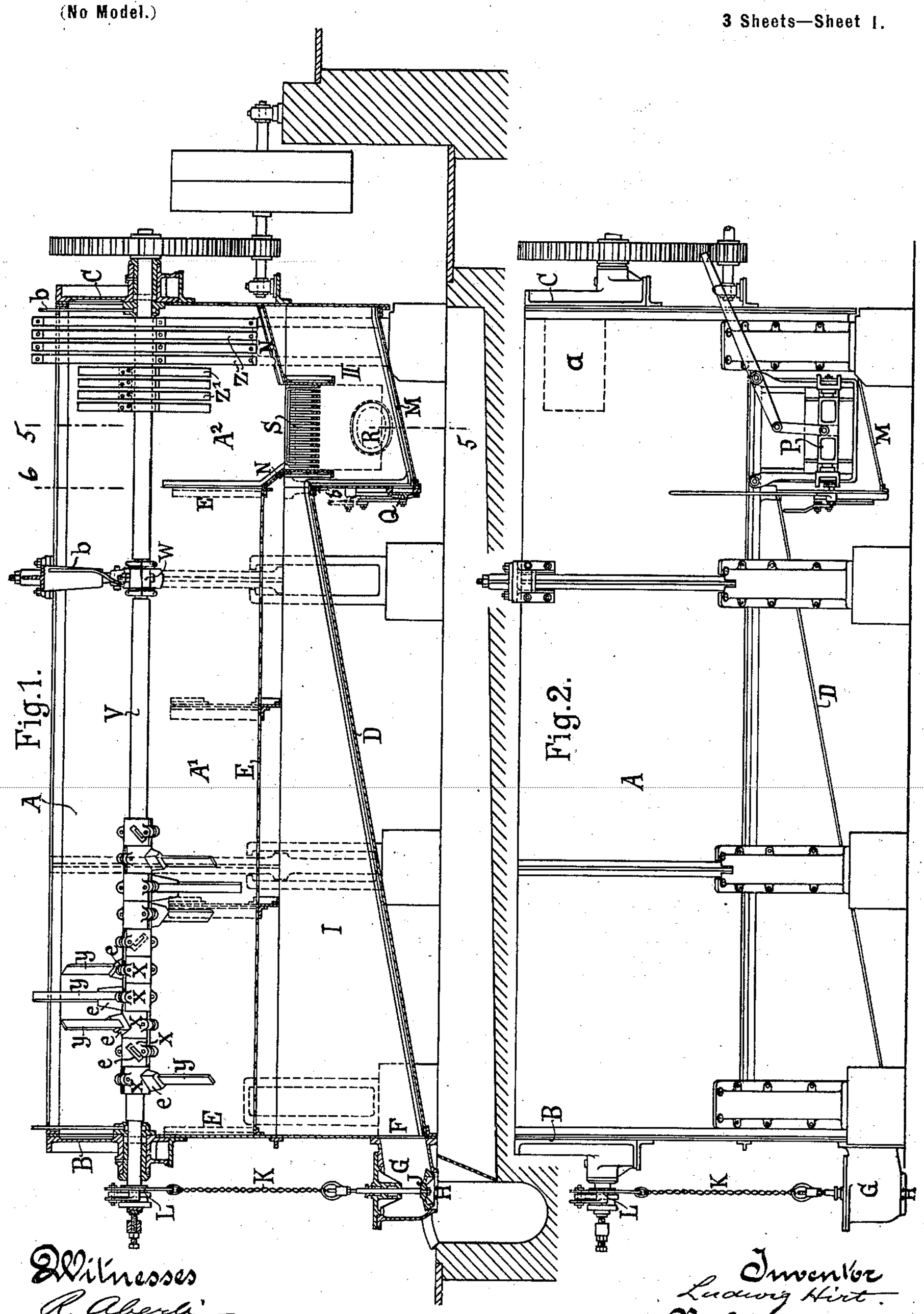
No. 654,793. Patented July 31, 1900.

L. HIRT.

WASHING MACHINE FOR BEETS, &c.

(Application filed June 2, 1899.)

(No Model.) 3 Sheets—Sheet 1.



Witnesses
R. Abendin
Geo. E. Thomas

Inventor
Ludwig Hirt.
By Briesen & Knauth
his Attorneys

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Fig.3.

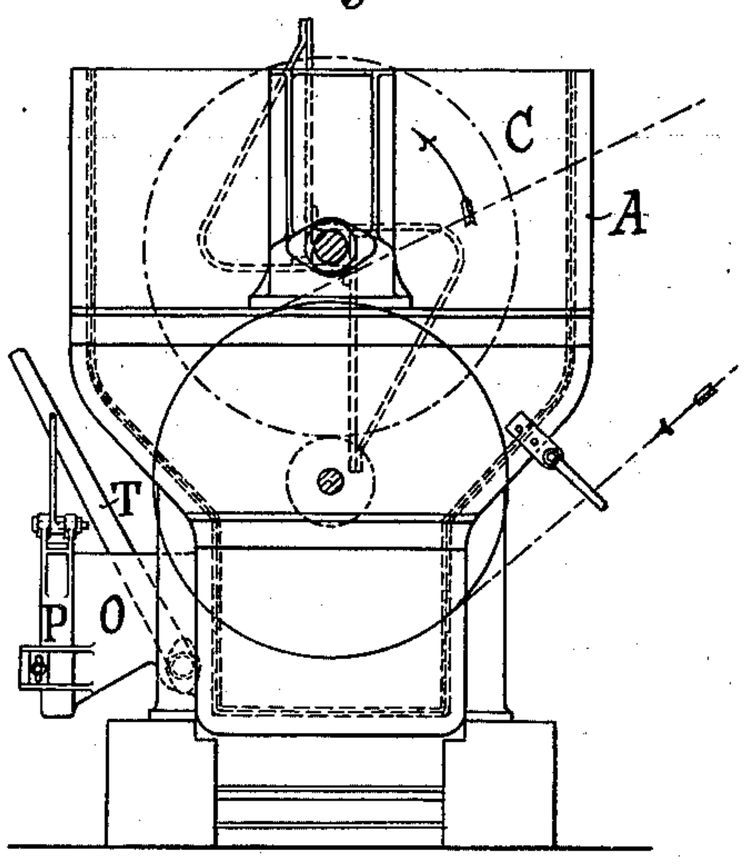


Fig.4.

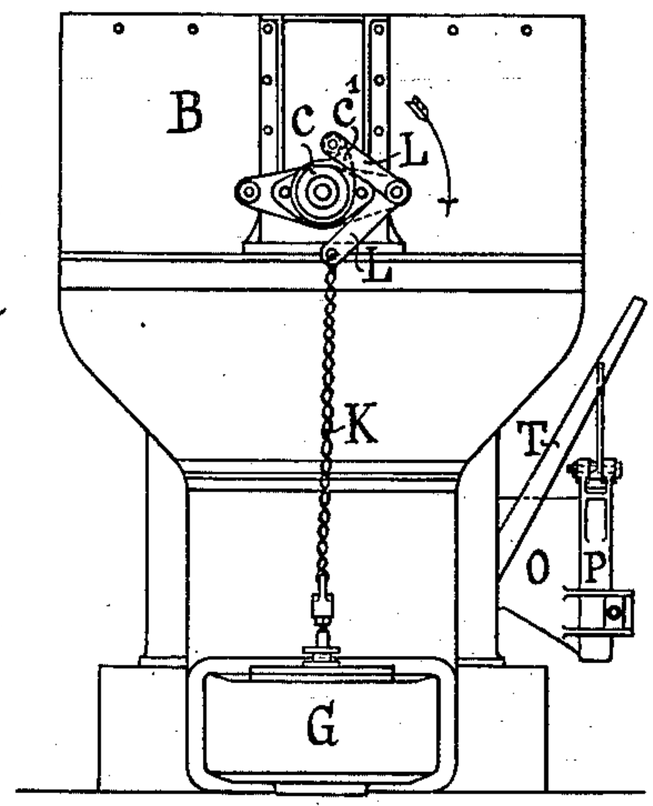


Fig.5.

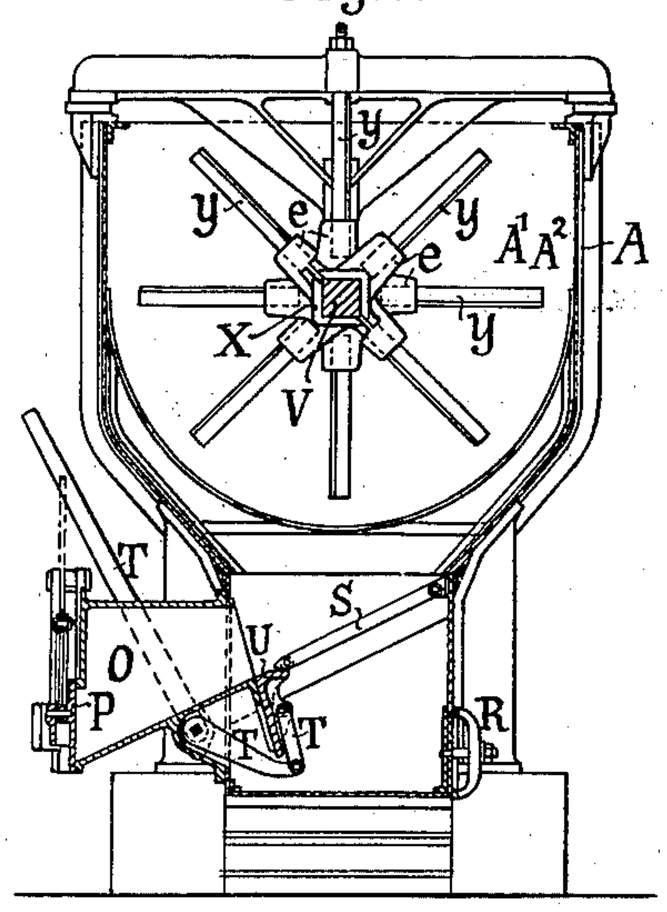
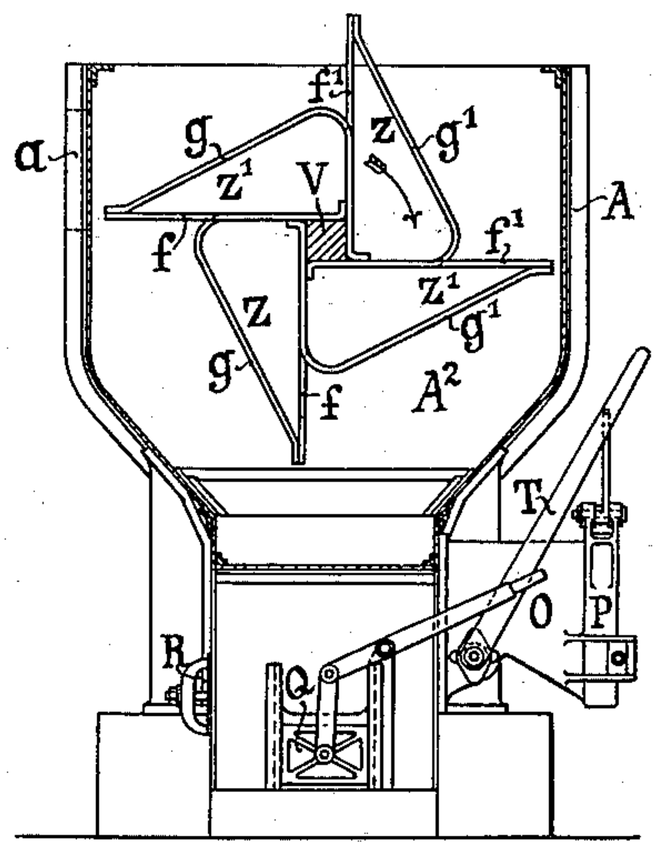


Fig.6.



Witnesses
R. Aberle
Fred. C. Ellmore

Inventor
Ludwig Hirt
By Briesen & Knauth
his Attorneys

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L. HIRT.

WASHING MACHINE FOR BEETS, &c.

(Application filed June 2, 1899.)

(No Model.) 3 Sheets—Sheet 3.

Fig. 7.

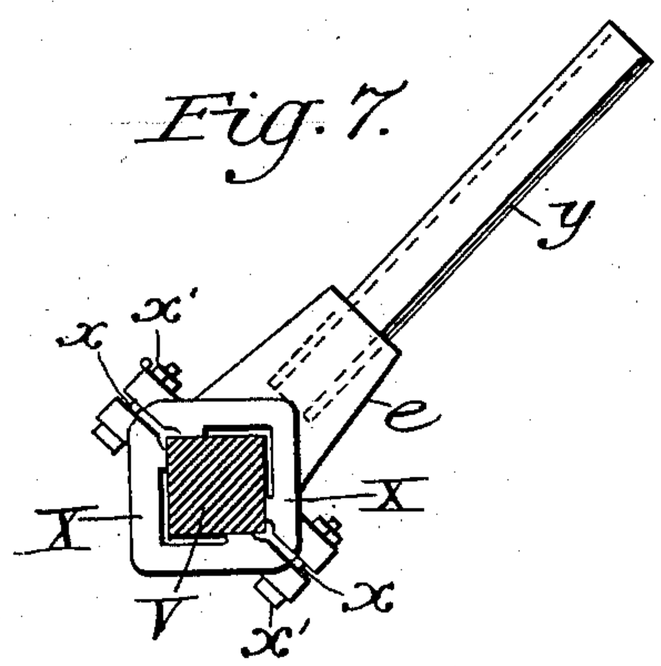
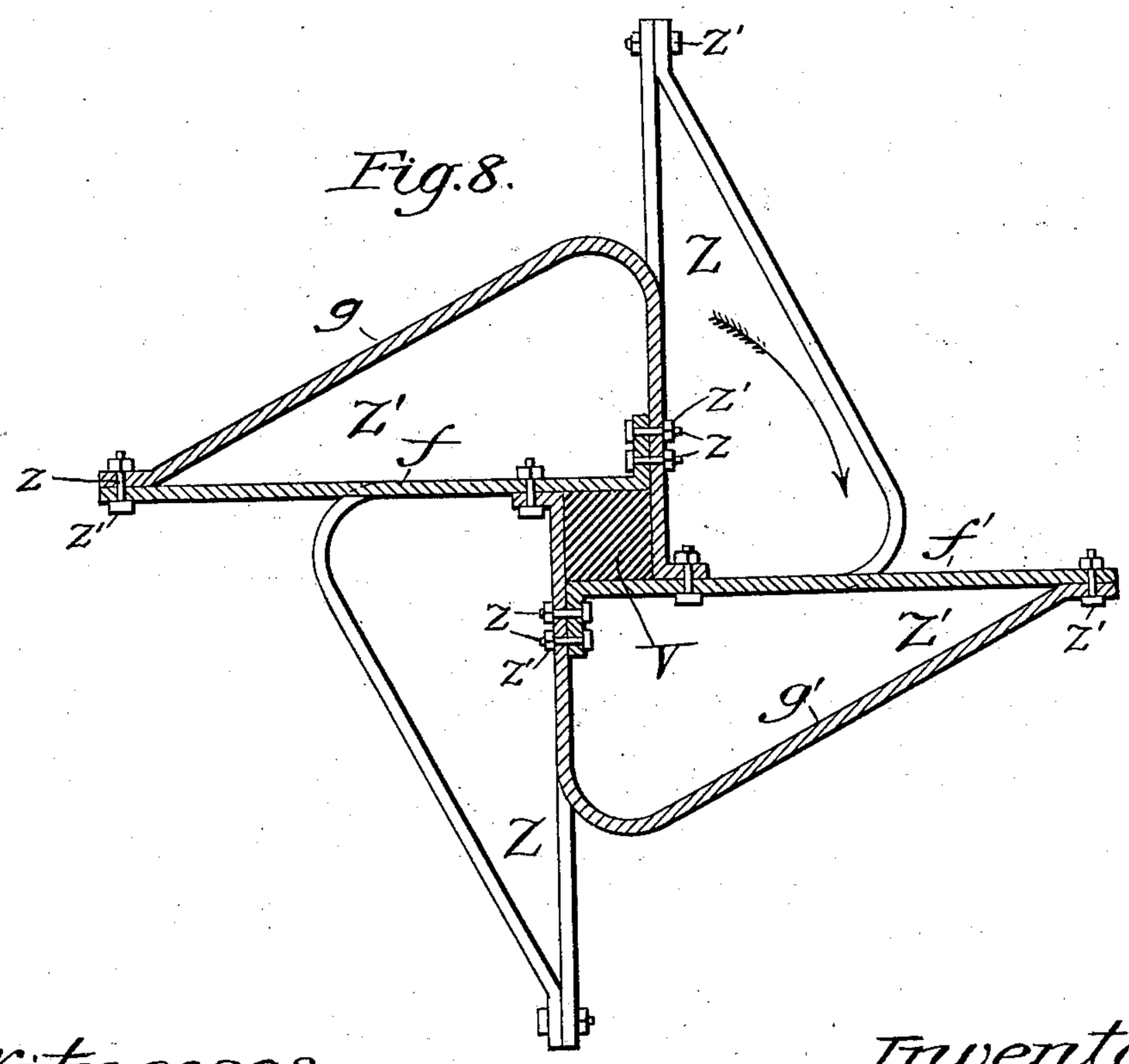


Fig. 8.



Witnesses:
Geo. E. Mowry
Walter E. Smith

Inventor:
Ludwig Hirt
By Briesen & Knauth
His Attorneys.

UNITED STATES PATENT OFFICE.

LUDWIG HIRT, OF GREVENBROICH, GERMANY, ASSIGNOR TO THE MASCHINENFABRIK GREVENBROICH, OF SAME PLACE.

WASHING-MACHINE FOR BEETS, &c.

SPECIFICATION forming part of Letters Patent No. 654,793, dated July 31, 1900.

Application filed June 2, 1899. Serial No. 719,065. (No model.)

To all whom it may concern:

Be it known that I, LUDWIG HIRT, a subject of the King of Prussia, German Emperor, and a resident of Grevenbroich, Kingdom of Prussia, Germany, have invented a certain new and useful Improvement in Washing-Machines for Beets and other Tuber-Like Products, of which the following is a specification.

This invention relates to an apparatus designed to free beet-roots and other tuber-like products from dirt by washing and to remove therefrom this dirt and any other heavy foreign bodies, and to finally remove the beet-roots or other tuber-like products automatically from the apparatus.

It is especially adapted to the washing of beet-roots in sugar manufacture.

The apparatus is illustrated in the accompanying drawings, in which—

Figure 1 is a longitudinal section. Fig. 2 is a side view. Fig. 3 is an end view from driving-gear side. Fig. 4 is an end view from opposite side. Fig. 5 is cross-section according to line 5 5, Fig. 1. Fig. 6 is cross-section according to line 6 6, Fig. 1. Figs. 7 and 8 are enlarged detail views of portions of the device, to be hereinafter described.

The apparatus consists, as shown in the accompanying drawings, of a boiler-like or trough-like receptacle A, closed at the ends by heads B and C, but open above. The cross-section of this vessel is seen to be perpendicular above, tapering inward below, and gradually acquiring a horizontal direction at the bottom. The entire vessel A consists of two separate compartments or divisions A′ and A^2. Compartment A′ has a bottom D, inclined in the direction of its length or axis, and a perforated horizontal curved bottom E. At the end B of this compartment and at its bottom there is a longitudinally-projecting chest G, which is connected by the opening F with the space I between the bottoms D and E. This chest or compartment G has in its bottom an orifice H, which is closed or controlled by the disk or single puppet-valve *j*, the axial spindle or stem of which goes through a suitable stuffing-box in the cover of the chest G. This valve can be opened and closed by a chain K and bent lever L. The compartment A^2 has also a bottom M, slanting in the direction of the axis of the apparatus and above this and adjacent to the perforated bottom E a funnel N. The lower part of A^2 is in communication with the laterally-projecting stone-chest O, one side or wall of which is partly formed by the slide-valve A. The bottom of this stone-chest or box O is also slanting. The part A^2 is likewise provided with a slide-valve Q and a manhole R. Attached to the funnel N is an inclined movable grating S. This lies in the same inclination with and forms a continuation of the bottom of the stone-box O and can by means of the lever-arm T be raised to the edge of the funnel N. By means of this lever movement the slide U, on which the grating lies, may be raised up so as to close the communication between the compartment A^2 and the stone-chest O when the grating is raised.

In the vessel A and passing through the heads B and C there is a shaft V of square scross-section which has its bearings on these ends and at W in the interior, it being understood, of course, that the shaft is cylindrical at these portions. Bearings at the head form stuffing-boxes through which the shaft passes. This shaft V is rotated by gear-wheels driven from a counter-shaft, as clearly represented in Figs. 1 and 2 of the drawings. In the compartment A′ there are on the shaft V two-part iron hubs, muffs, or clamping-sleeves X, (see Fig. 7,) the two longitudinally-parted halves of which are connected together by bolts *x* and nuts *x′*, that also attach them firmly to the shaft V. These clamping sleeves or hubs, which are placed in a screw line, have four-sided projections *e*, in which are four-sided holes, in which latter are inserted and fastened arms *y*, of four-sided cross-section. The sleeves and arms are spirally arranged, and the flat surfaces of the arms are oblique to the plans of rotation. The stirring-arms reach nearly to the curved perforated bottom E. In the compartment A^2 there are two sets of ejector-arms Z Z′, which are also fast on the shaft V. There are four pairs in each set of these ejectors—*i. e.*, eight pairs of all. Each consists of a straight flat piece of iron

f f' (see Fig. 8) with bent inner end, and of a bent flat piece of iron *g g'*, having a bent outer end, the bent and the straight pieces being in such manner connected, as by means of bolts and nuts *z z'*, that the fixing to the shaft is thereby assured. The four pairs of ejectors Z' that lie together are at an angle of ninety degrees on the shaft to the four adjacent pairs Z lying together on the same shaft. In the compartment A^2 there is in the upper part of the wall a delivery-orifice *a* for the washed roots or other products. The middle bearing W of the shaft has screw arrangement for its vertical adjustment. At the end B the shaft V bears keyed thereon outside the compartment A a cam *c*, on which lies one end of the lever L. By the rotation of the shaft V the elevated portion *c'* of the cam *c* raises the lever, by which the chain K, connected thereto, opens the valve *j* and holds it open until the cam lets the lever fall, upon which the valve by reason of its own weight and the water-pressure thereon suddenly falls shut. A special conduit is also provided for the introduction of the wash-water into the apparatus.

The operation of the apparatus is as follows: After the apparatus has been filled with water, the stirring device set in motion, and water let onto the bearings, the beets are continuously introduced at the end B. The arms *y* force the beets into the water, mix them together, and rub them among and against each other, so that the dirt which lies thereon is washed off. At the same time the stirring device carries the beets along toward the compartment A^2. The dirt which has been washed off passes out through the perforated bottom E into the space I. By means of the rotation of the stirring device the valve *j*, as before explained, is raised or opened once in each rotation. Part of the dirty water flows then through the opening H into the underlying channel or conduit. By the sudden closing of the valve *j* there is caused an agitation of the water in the space I by which the latter is thoroughly mixed. By means of these continually-repeated operations the water and the dirt in the space I never come to rest, and therefore the dirt can never settle. A further advantage of this arrangement is that the necessary water consumption is kept very small. The washed roots pass into the compartment A^2. Here those materials, as stones, &c., which are heavier than the roots are separated therefrom. These stones, &c., fall on the grating S and from this go to the stone-box O. From time to time the slide U and the thereonlying grating S are raised by the lever arrangement T. This grating then lies on the edge of the funnel N. At the same time the slide U closes the stone-chest O from communication with the compartment A^2. The stone compartment or chamber O can then be emptied by opening the slide P without the water in A^2 being able to flow out. After the closing of the slide P the slide U is opened and the grating S again let down into place. The last-remaining dirt and smaller foreign bodies fall through the grating S and collect in the chamber I I, from which they are emptied from time to time by the opening of the slide Q. The beets or other roots are raised by the ejectors Z Z' and fall in a clean condition out of the apparatus through the discharge-orifice *a*.

I claim—

1. An apparatus for washing beet-roots and similar articles and simultaneously removing therefrom the dirt and other foreign substances and the washed roots, consisting essentially of a receptacle A divided into two compartments, A' A^2, both of which are provided with inclined bottoms D M, compartment A' having a perforated curved bottom E and on its end or head a chamber G in communication with the space I and having a valve J and means for continually opening and closing said valve, compartment A^2 having a funnel N bearing a grating S and having a slanting bottom M, also a stone-box O and slide-valve Q, and the entire apparatus provided with a lengthwise horizontal shaft V on which there are spirally arranged the arms of a stirring device *x e* Y, and ejector-arms Z Z'.

2. In an apparatus for washing beet-roots and similar articles the combination of a compartment provided with a perforated bottom for the free passage of the finer particles of dirt, a dirt-collecting chamber beneath said perforated bottom, an outlet communicating with said dirt-collecting chamber, a valve for controlling said outlet, said valve being closed by the pressure of the water thereon, mechanical means for automatically and intermittently opening said valve, a second compartment separate from but at all times in communication with said first-named compartment, mechanism contained within said second compartment for separating stones and like heavier particles from the beet-roots or other articles treated and means for discharging the stones from the apparatus without withdrawing the water therefrom.

3. In an apparatus for washing beet-roots and similar articles with a stirring device contained therein, the combination therewith of ejectors Z Z', one-half thereof being arranged at ninety degrees to the other half on the shaft, each ejector consisting of two arms, each arm consisting of a straight flat iron piece *f* and a curved flat iron piece *g*, the iron piece *f* being bent at one end, the iron piece *g* being bent at both ends for the connection of these two pieces together and to the shaft by bolts and nuts.

4. In an apparatus for washing beet-roots and similar articles, the combination therein with the compartment A^2, for the purpose of separating and removal of the heavier foreign bodies, of a stone-box O with slide P and slanting bottom and of the inclined grating S, with an attached slide U movable on the funnel N

said grating S and slide being adapted to be raised by the lever-arm T against the margin of the funnel N, while the slide U closes the stone-chest from connection with the compartment A^2, so as to empty the stone-chest without undue loss of water.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 13th day of May, 1899.

LUDWIG HIRT.

Witnesses:
HERNANDO DE SOTO,
CARL KNOOP.