Sept. 2, 1924. 1,507,054

K. FÖLSCHE

HYDRAULIC UNLOADER

Filed Aug. 15, 1921 . 2 Sheets-Sheet 1

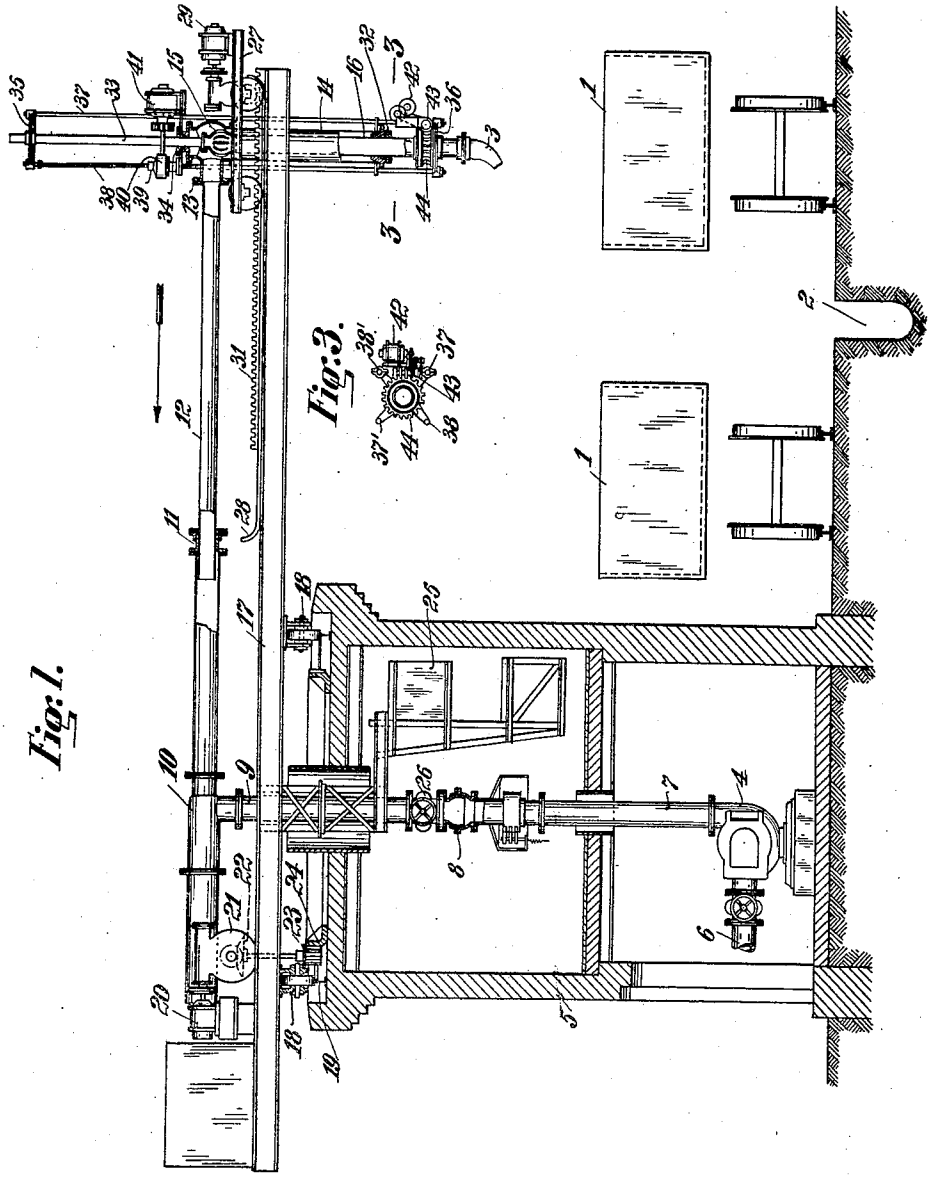

Fig. 1.

Fig. 2.

Inventor.
Karl Fölsche
By Henry Orth Jr Atty.

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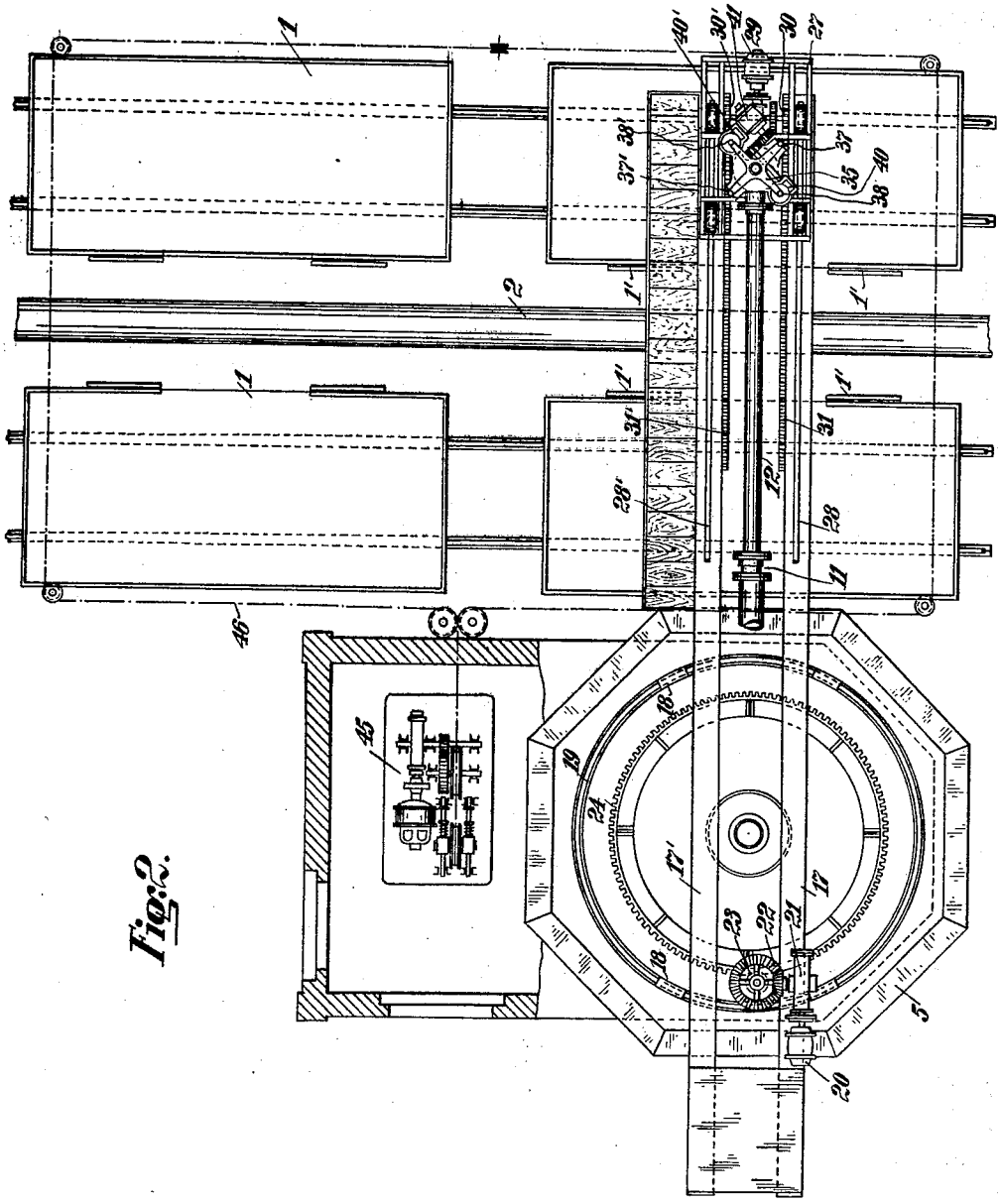

Fig. 2.

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By Henry Orth Jr.
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Patented Sept. 2, 1924. 1,507,054

UNITED STATES PATENT OFFICE.

KARL FÖLSCHE, OF HALLE-ON-THE-SAALE, GERMANY.

HYDRAULIC UNLOADER.

Application filed August 15, 1921. Serial No. 492,454.

To all whom it may concern:

Be it known that I, KARL FÖLSCHE, residing at Halle-on-the Saale, Germany, have invented certain new and useful Improvements in Hydraulic Unloaders (for which German Patent No. 289,124, dated February, 20, 1914, has been granted and for which application for patent in Germany has been filed July 21, 1914), of which the following in a specification.

This invention relates in general to a device for unloading loose material in bulk from railway cars by means of a water jet. It relates more particularly to a device of the kind that enables the nozzle from which the water is ejected, and which must be arranged to be moved relatively to the cars in a vertical and a horizontal direction, to be moved in such a manner that in all places into which the nozzle is shifted the most favorable effect of the water jet on the material to be discharged is obtained. In accordance with my invention all the motions executed by the nozzle are imparted to it from an operator's position in such a way that the inclination of the water jet to the horizontal always remains the same in all places into which the nozzle is brought.

A constructional form of the invention is shown in the drawing.

Fig. 1 is a side elevation of my novel device, partly in vertical section,

Fig. 2 is a corresponding plan view, and

Fig. 3 is a sectional plan view of Fig. 1 on the line 3—3.

In the form illustrated my invention is adapted more particularly for unloading sugar beet from railway cars in sugar mills. The sugar beet are brought in open trucks 1, 1 shown diagrammatically in the drawing, to the sugar mill. The rails at the sugar mill are situated adjacent to a trough or flume 2 and the cars are rolled into positions beneath the unloading device, which is similar in appearance to a revolving crane. The portion of the device that acts on the material to be unloaded consists of a nozzle 3 capable of being moved in the space above the car and through which a powerful jet of water may be spurted. The nozzle receives water under pressure which is preferably supplied from a centrifugal pump 4 in the interior of a tower-like structure 5. The suction pipe 6 takes in water from any suitable supply (not shown) while the pressure pipe 7 extends upward in the middle of the tower 5. Connected to the pipe 7, preferably by means of a ball socket 8, is the revoluble ascension pipe 9 which is connected to the horizontal pipe 10. The pipe 10 is closed at one end and has a stuffing box 11 at its other end through which a horizontal telescopic tube 12 may be slipped in and out. The outer end of the tube 12 is connected by means of a flange 13 to a vertical tube 14.

From the vertical tube 14 the water under pressure passes through slots 15 into a vertical pipe 16 to the lower end of which the nozzle 3 is fixed. The inner pipe 16 and the external pipe 14 have a common axis and the inner pipe 16 can be turned about the said axis and moved in the pipe 14 in telescope fashion in the direction longitudinally of the said axis. The pipes 9, 10, 12, 14, 16 with the nozzle 3 and all the devices for shifting the pipes rest upon a frame which is preferably made of two iron girders 17, 17′ which extend parallel to the pipes 10, 12 and are joined to each in any suitable manner by cross-ties. The frame is borne by rolls 18 adapted to travel round on a circular rail 19 mounted on the tower 5. 20 is an electromotor for turning the frame 17, and all the parts fixed to it, about the axis of the tower. Through any suitable gear, such as a worm and worm wheel enclosed in a casing 21 and bevel wheels 22, the motor 20 drives a pinion 23 which is in mesh with a circle of teeth 24 fixed on the tower 5. When the motor is started the frame 17 and all the parts fixed to it including the nozzle 3 are rotated around the axis of the tower.

The operator's cage 25 is also mounted on the frame 17 so that it is also carried round with it. Switching devices for the electromotor that operate the frame 17 and the various movable parts are arranged at the operator's position in the well known manner adopted in cranes. A stop valve 26, by which the operator can regulate the flow of water to the nozzle 3, can also be worked from the operator's position.

The outer end of the pipe 12 together with the tube 14 and the devices associated therewith rests upon a small truck 27 arranged like a crane traveller and adapted to travel on rails 28, 28′. The truck 27 is driven by an electromotor 29 which, by suitable inter-

mediate gear, rotates two spur wheels 30, 30 that engage with racks 31, 31'. As has been already mentioned the electromotor 29 is controlled by devices arranged at the operator's position 25. By causing the truck 27 to travel along the rails 28 the pipe 12 is pushed into the pipe 10 or pulled out of it.

The tube 16 that carries the nozzle 3 is cut off from communication with the pipe 14 by a stuffing box 32 in which the tube 16 can slide and rotate. At its upper end the tube 16 has an extension 33 which passes through a stuffing box 34 at the top end of the pipe 14. By this means the tube 16 is securely guided in the pipe 14. Mounted at the top of the rod 33 is a cross-piece 35 and another cross-piece 36 is fixed to the lower end of the tube 16. These cross-pieces are interconnected by four rods one pair 37, 37' of which is smooth while the other pair 38, 38' have screw threads at their upper ends and are provided with nuts 39 at their upper ends. The nuts 39, whose vertical position relative to the frame 17 is fixed, are shaped at their peripheries in the form of worm wheels which engage with worms 40, 40' that can be rotated through speed-changing gear by the electromotor 41. The motor is also controlled from the operator's position 25. When it is started the tube 16 is pushed into or pulled out of the pipe 14 and the height of the nozzle 3 above the car 1 is thus decreased or increased according to the direction of rotation of the said motor 41. The tube 16 in the pipe 14 is rotated by a small electromotor 42 and carries the nozzle 3 around with it. The electromotor 42 may be arranged to act through the medium of gear wheels on a worm 43 which engages with the worm wheel 44 keyed to the lower end of the pipe 16. The motor 42 is also controlled from the operator's stand 25.

The motions of the nozzle 3 driven by the electromotors 20, 29, 41 and 42 may take place one at a time or all together without mutually interfering. It will be obvious that during all of these motions of the nozzle 3 (which are imparted to it for the purpose of bringing it into the proper position relatively to the material to be unloaded from the car 1) the angle which the jet issuing from the nozzle 3 forms with the horizontal is never changed. By this means it is possible to maintain the most favorable effect of the jet in all positions of the nozzle.

The mode of operation of my novel device is as follows:

The loaded car 1 may be moved to the place where they are to be unloaded by any known means. In the example shown in Fig. 2 it is assumed that a shunting windlass 45 is provided for this purpose. This windlass drives an endless rope 46 to which the car may be temporarily hitched by any suitable kind of gripping device or the like. As this kind of rope driving plant is well known a more detailed description of the same is unnecessary.

When a car has been hauled into position beneath the frame 17, 17' it is unhitched and the side doors 1' of the truck are opened. Then the nozzle 3 is moved into the proper position by means of the motors controlled by switching devices at the operator's position and, the pump 4 having been started, a powerful water jet is directed against the sugar beet (or the like) near the open door. The sugar beet will then slip out of the car and will be thrown by the water into the channel or launder 2 and transported by the impelling water to the places where they are needed. As the unloading operation proceeds the operator at his stand 25 shifts the nozzle 3.

Since, in all positions into which the nozzle is shifted, the inclination of the water jet is maintained at the angle which has been found by experience to be the most favorable for the kind of material dealt with, the work of unloading will be considerably expedited.

When a car is completely unloaded the pump is stopped and a new car is hauled into position by means of the windlass 45 and the rope 46.

I claim:

1. In a hydraulic unloading device a nozzle inclined to the horizontal, means to raise and lower the nozzle and means to bodily move said nozzle in a plane without changing its angular relation to the horizontal.

2. In a hydraulic unloading device an inclined nozzle, means to raise and lower said nozzle, means to bodily move the nozzle in a plane and means to traverse the nozzle, all of said means operative without changing the inclination of the nozzle.

3. In a hydraulic unloading device, an inclined nozzle, means to vertically raise and lower said nozzle, means to bodily move the nozzle in a plane, means to traverse the nozzle and means to rotate the nozzle on a vertical axis.

4. In a hydraulic unloading device a vertical supply pipe, a crane, means to swing said crane about said pipe, a substantially horizontal telescoping continuation of said pipe carried by said crane and rotatable with respect to said pipe, a vertical extension on the end of said continuation and a telescoping nozzle member in said vertical extension.

5. In a hydraulic unloading device, a tower, a vertical water supply pipe therein, a cantilever crane mounted on said tower, mechanism to rotate said crane about said pipe as a centre, a continuation of said pipe supported along said crane, a vertical extension of said continuation at the end of said

crane, a telescoping nozzle member in said extension, mechanism to raise and lower said nozzle member and independent mechanism to rotate said nozzle member.

6. In a hydraulic unloading device, a tower, a vertical water supply pipe therein, a cantilever crane mounted on said tower, mechanism to rotate said crane about said pipe a horizontal telescopic continuation of said pipe mounted on said crane, a truck on said crane supporting the telescoping end of said continuation, mechanism to traverse said truck and extension along the crane, a depending extension of said continuation, a nozzle member telescoping in said extension and mechanism to rotate said member and mechanism to telescope the member.

7. In a hydraulic unloading device, an inclined nozzle, mechanism to move said nozzle in three directions substantially at right angles while maintaining the inclination of the nozzle to the horizontal, constant and means to rotate the nozzle on a vertical axis.

In testimony whereof I have signed this specification in the presence of two witnesses.

KARL FÖLSCHE.

Witnesses:
KARL KRUGER,
WILLY SCHMIDT.