J. H. VAN GLAHN.
LIME HYDRATING MACHINE.
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INVENTOR

No. 872,390.

WITNESSES:

E. C. Walter
Ada Cameron

SIGNATURES
UNITED STATES PATENT OFFICE.

JOHN H. VAN GLAHN, OF TOLEDO, OHIO.

LIME-HYDRATING MACHINE.

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To all whom it may concern:

Be it known that I, JOHN H. VAN GLAHN, a citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Lime-Hydrating Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to a machine for the hydration of lime and is designed to furnish a mechanism by means of which definite quantities of quick lime may be mechanically fed to the machine and by means of which the interval of time that the valve is open. The length of time that the valve remains open is governed by means of the winch 12 as above stated.

Figure 1 is a side-elevation of my machine with one of the sides removed to disclose the interior mechanism and arrangement; Fig. 2, an end-elevation of the same seen from the left, with the end-covering removed; Fig. 3, a vertical transverse sectional elevation taken on line x, Fig. 1; Fig. 4, a like view taken on line y, Fig. 1, and Fig. 5, a similar view taken on line y, Fig. 1.

Like numerals of reference indicate like parts throughout the drawings.

In the drawings, 1 is an elongated rectangular frame closed tightly at its sides, ends, top, and bottom to prevent the escape of dust. Lengthwise of the chamber thus formed is a trough 2 forming a horizontal partition through nearly the entire length of the machine. Over the top of the inlet-end of the machine is a hopper 3 having a spout 4 pivoted, as at 5, and discharging, as at 6, into the chamber of the machine and upon the trough-like floor 2.

7 is a curved finger mounted upon a shaft 8, the finger at each rotation of the shaft engaging the discharge-end of the spout 4, lifting the end of the spout and permitting it to drop. The jar or knock thus given to the spout causes the lime to be fed from the hopper uniformly. The shaft 8 is journaled at one end of a frame 9, pivoted, as at 10, upon the frame of the machine, the opposite end of the frame 9 being connected by cord 11 with a winch 12 by means of which the knocker 7 is adjusted in relation to the spout 4, thus regulating the length of drop of the spout and the consequent force of the knock.

Quick lime being supplied to the hopper 3, the shaft 8 and knocker 7 being in motion, the contents of the hopper will be delivered into the hydrating chamber of the machine at a regular uniform rate, the feed from the hopper being regulated by means of the winch 12 as above stated.

13 is a tank mounted upon the top of the machine near the hopper 3 and divided into an upper and lower chamber. Water is fed into the upper chamber through supply pipe 14 and is discharged through the opening 6 into the hydrating chamber by discharge pipe 15 leading from the lower chamber of the tank 13.

16 is a valve in the supply-pipe controlled by an adjustable float 17, this float and valve tending to maintain the water in the upper chamber of the tank constantly at a uniform height.

In the floor of the upper chamber of the tank is a valve 18 the stem of which is connected with a lever 19 fulcrumed at 20 and connected at its other end, as at 21, with a vertical rod 22 which at its lower end is pivoted, as at 23, to a lever 24. This lever is fulcrumed at one end on the side of the machine, as at 25, the other end of the lever lying in the path of a finger or wiper 26 fixed radially upon the shaft 27. At each rotation of the shaft 27 the valve 18 is opened and the water is permitted to flow from the upper chamber of the tank as long as the rod 24 is engaged by the wiper 26, permitting a quantity of water to flow from the upper chamber of the tank into the lower chamber in direct proportion to the time that the valve 18 is held open. The length of time that the valve 18 remains open is governed by means
of an adjusting device in the lever 24. This lever is made in two parts which overlap each other, as at 24a, (see Fig. 1), the overlapping portions being clamped together by screws 24b. By means of the screws and holes or slots in the overlapping ends of the two parts of the lever 24 the lever may be lengthened or shortened at will so that the wiper 26 may barely touch the end of the lever 24 or it may be caused to engage the lever for a considerable portion of the rotation of the wiper. A definite portion of water having been permitted to flow into the lower chamber of the tank, this water now escapes through the pipe 15 at the same time that the lime is flowing from the spout 4 and in a quantity in direct proportion to the regulated feed of the lime. The discharge pipe 15 is provided with a cock 15a by which the flow of the water from the lower compartment of the tank may be exactly adjusted.

The shaft 27 extends across the hydrating chamber at its inlet-end, and on this shaft, on opposite sides of the chamber, are mounted a pair of sprocket-wheels 28. At the opposite end of this chamber is journaled a shaft 29, extending across the hydrating chamber, and on this shaft are fixed, at opposite sides of the chamber, a pair of sprocket-wheels 30. Over each pair of sprocket-wheels 28-30 passes an endless chain 31. Secured horizontally between these two chains, at regular equi-distance intervals, are scrapers or plows 32 curved in vertical section and having operative edges which conform to and barely touch the bottom of the trough 2.

Between the lines z-z and y-y, Fig. 1, the frame and casing of the machine is broadened as illustrated in Fig. 4. In this broadened part of the machine at opposite sides of the path traversed by the plows 32 are suspended vertical screens or sieves 33 from hangers 34. These screens are connected by rods 35 to levers 36 fulcrumed at one end, as at 37, upon the frame of the machine, the other end of the lever being connected, as at 38, with a cam-rod 39 connected with a cam 40 on shaft 41, driven as hereinafter described.

The chamber of the broadened part of my machine is provided with a floor 42 inclined downwardly toward its longitudinal center 55 as shown in Fig. 4, this trough-like floor extending beneath the trough 2 and the screens 33. In the meeting angle of the floor 42 is a worm conveyer 43 leading to the discharge spout 44 of the machine.

At its discharge end the trough 2 is inclined upwardly and terminates directly above a shaking screen 45 swiveled at one end upon horizontal cranks 46 and at its other end upon the cam-rod 39. The discharge end of the screen 45 has an outlet spout 47. Beneath the screen 45 is a hole 48, in the floor of the screen-box, leading into a drum 49 within which rapidly revolve the wings or beaters 50 mounted on shaft 51, journaled in the sides of the machine and driven as indicated by the dotted lines in Fig. 1. The drum 49 has an opening which communicates, as at 52, with the conveyer 43. The underside of the drum 49 is pivoted as at 49a, and one margin of its outlet is adjustable by means of wedge 49b by means of which the space between the wall of the drum and the margin of the beater 50 may be adjusted as may be required.

The means for driving the various mechanisms of my machine will be readily understood from an inspection of Fig. 1 of the drawings. 53 is a driving pulley secured to a shaft 53a journaled on top of the machine. On this shaft is a chain-wheel from which power is transmitted through chain 54 to a pulley on a shaft 55. On the shaft 55a is another chain-wheel which transmits power to gears 56, 57, 58, and 59, in the order named, and through the chains 31 to the chain-wheel 28. On the shaft 55a is still another pulley which, through belt 60, transmits power to bevel gears 61 which drive the conveyer 43, also to pulley 62 which through belt 63 drives the eccentric and its shaft 40-41.

The operation of my device is as follows: The hopper 3 being supplied with quicklime, broken into small pieces, the tank being connected with a water supply, and the machine being in motion, the lime and water are fed into the hydrating chamber in regulated quantities and proportions as above described. Now the scrapers or plows 32 catch the lime and force it slowly along the trough 2, turning the material over and over and thoroughly agitating it as it moves forward into that part of the chamber bounded at opposite sides by the reciprocating screens 33. By the time the lime has reached this point it has greatly increased in bulk and has become soft and to a great extent powdered. The screens 33 rubbing against the sides of the mass cause the soft and powdered lime, for the most part, to fall through the screens 115 down upon the inclined surfaces 42 and into the open conduit of the conveyer 43 from whence the powdered finished material is conveyed to the spout 44 and into bags or other receptacles. That part of the lime which does not pass through the screens continues in its course along the trough 2 and is further turned and agitated by the plows 32 until it falls upon the shaking screen 45. The lime which is fine enough to pass through this screen falls into the drum 49 where it is pulverized by the attrition and blows of the beater-arms 50. The lime from the drum 49 falls into the conveyer 43 with the other finished product. That part of the
material which does not pass through the screen 45 passes over the end of the screen and out through spout 47 from whence, if desired, it may be conveyed back to the hopper

3 to be again treated.

Having described my invention and its operation, what I claim and desire to secure by Letters Patent is,—

1. In a machine of the described character, an elongated chamber having a trough-like bottom, an endless series of scrapers traversing said trough-like portion, means at one end of said chamber for feeding into the chamber lime and water in regulated quantities and proportions, at the other end of said chamber upright screens at the sides of the chamber, means for actuating said screens, a screen beneath the discharge end of the trough-like part arranged to separate the coarse from the fine hydrate, and means for actuating said screens.

2. In a machine of the described character, an elongated chamber having a trough-like bottom, an endless series of scrapers traversing said trough-like portion, means at one end of said chamber for feeding into the chamber lime and water in regulated quantities and proportions, at the other end of said chamber upright screens at the sides of the chamber, means for actuating said screens, a screen beneath the discharge end of the trough-like part arranged to separate the coarse from the fine hydrate, and means for actuating said screen, a pulverizing mechanism arranged to receive the fine hydrate from the screen last mentioned, and means for conveying the output of the pulverizer and of the screens first mentioned to a common outlet.

3. In a lime hydrating machine, a hopper, a spout for the hopper pivoted at its upper end, a knocker for the lower end of the spout, means for adjusting the force of the knock, a tank having two compartments one above the other, a float valve in the upper tank, a valve between the two tanks, a driving gear for the machine, connections between the driving gear and said knocker and between the driving gear and said last mentioned valve, means for the adjustment of said connections whereby the force of the knock may be regulated and whereby the intervals between the movements of said last mentioned valve may be varied, an elongated chamber into one end of which lead said hopper and said tank and having a trough-like floor, an endless series of scrapers arranged to agitate and to carry the lime through said chamber, screens for separating the coarse from the fine hydrate, and means connected with said driving gear for actuating said screens.

4. In a lime hydrating machine, an elongated chamber having a trough-like floor, means for feeding lime and water into one end of said chamber in regulated quantities and proportions, means for agitating and conveying lime through said chamber from its inlet-end to its discharge-end, a pair of screens at opposite sides of said chamber, a floor beneath said chamber and said pair of screens inclined downwardly and inwardly toward each other, and a conveyer in the meeting angle of said floor.

5. In a lime hydrating machine, an elongated chamber having a trough-like floor, means for feeding lime and water into one end of said chamber in regulated quantities and proportions, means for agitating and conveying lime through said chamber from its inlet-end to its discharge-end, a pair of screens at opposite sides of said chamber, a floor beneath said chamber and said pair of screens inclined downwardly and inwardly toward each other, a conveyer in the meeting angle of said floor, and whereby the intervals between the movements of said last mentioned valve may be varied, an elongated chamber into one end of which lead said hopper and said tank and having a trough-like floor, an endless series of scrapers arranged to agitate and to carry the lime through said chamber, screens for separating the coarse from the fine hydrate, and means connected with said driving gear for actuating said screens.

6. In a lime hydrating machine, devices for feeding lime to the machine in regulated quantities, devices for feeding water to the lime in regulated volume, means for agitating the wetted lime, a screen for separating the coarse from the fine product, another screen, means for transferring the coarse product from the first mentioned screen to said other screen, means for pulverizing the finer product from said other screen, means for mixing the finer products of said two screens, and means for conveying said mixture to a common outlet.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN H. VAN GLAHN.

Witnesses:

Clem V. Wagner,
Ada Cameron.