Nov. 17, 1931. H. SPOERRI 1,832,148

DEVICE FOR SLAKING LIME

Filed Feb. 8, 1930 2 Sheets-Sheet 1

FIG. 1

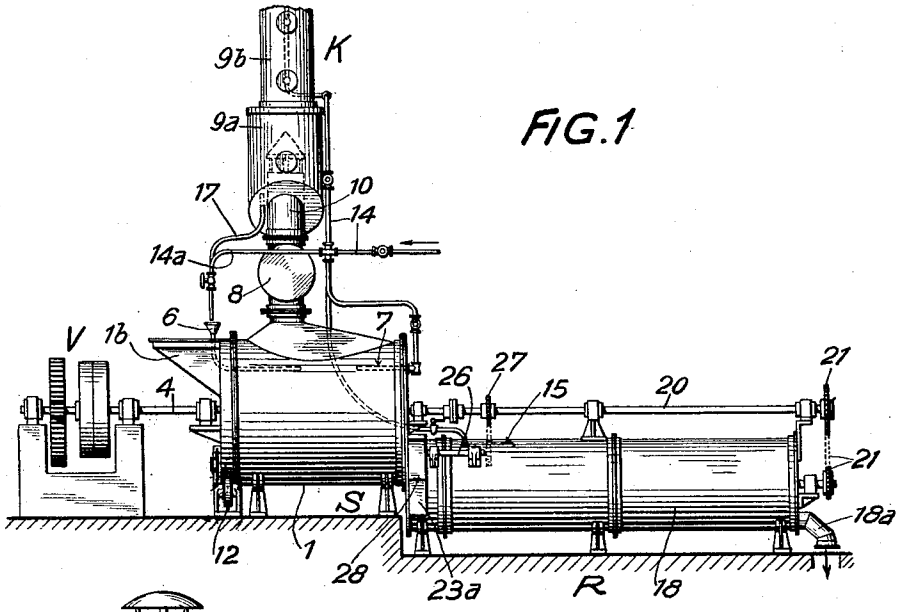


FIG. 2

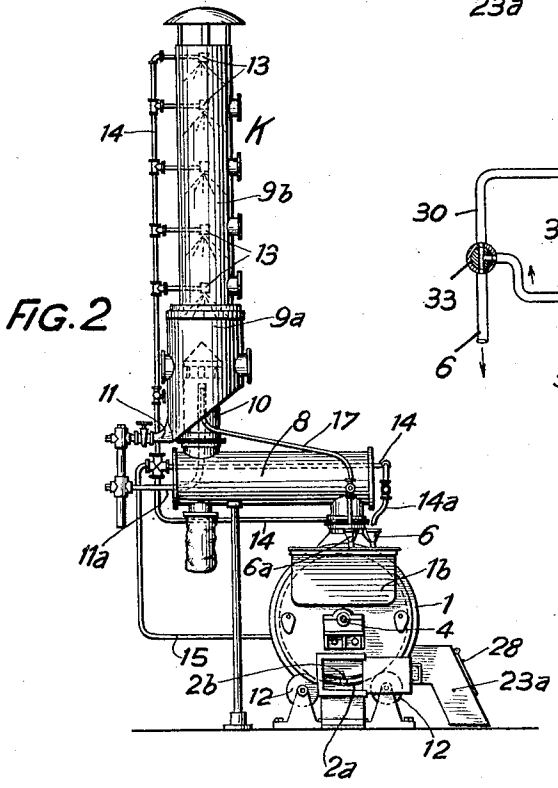
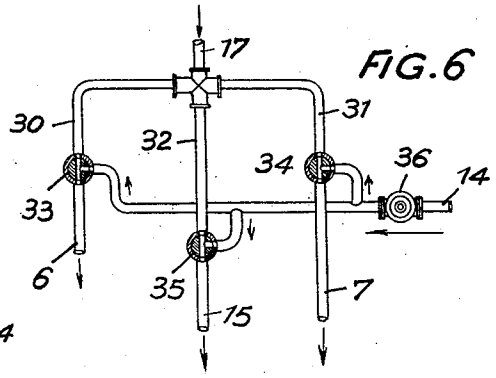


FIG. 6



INVENTOR:

Heinrich Spoerri,

By Henry Orth & Co

Atty.

Nov. 17, 1931. H. SPOERRI 1,832,148

DEVICE FOR SLAKING LIME

Filed Feb. 8, 1930 2 Sheets-Sheet 2

FIG. 3

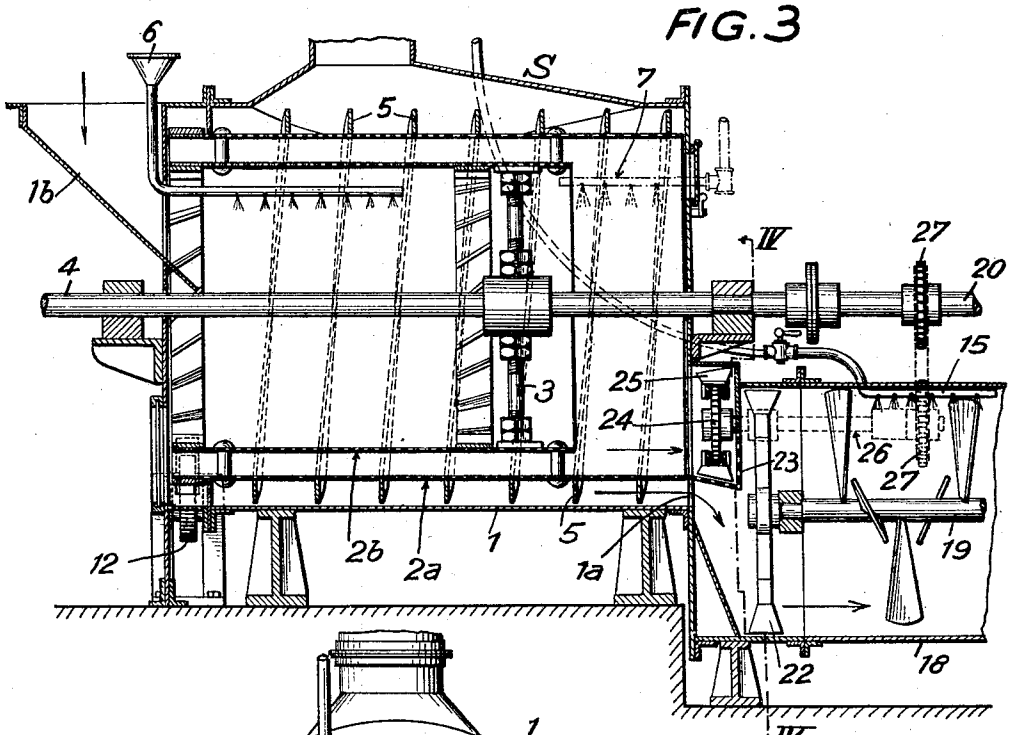


FIG. 4

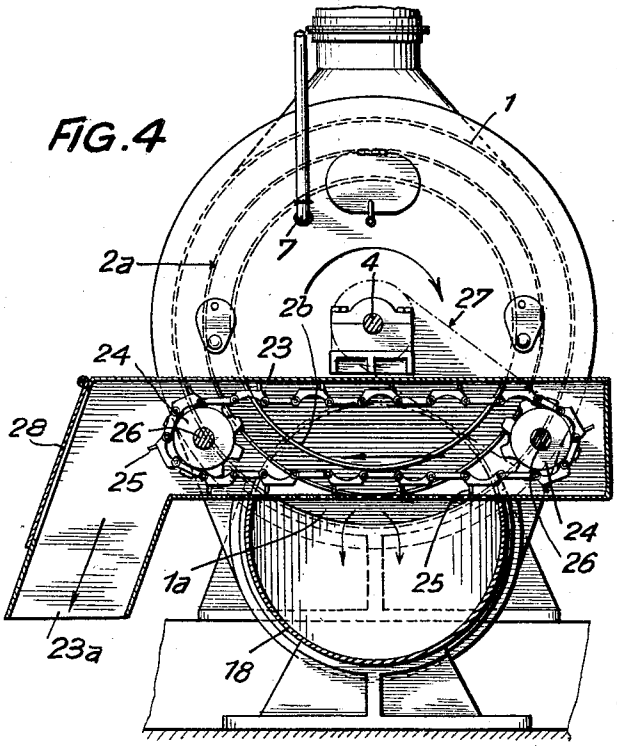
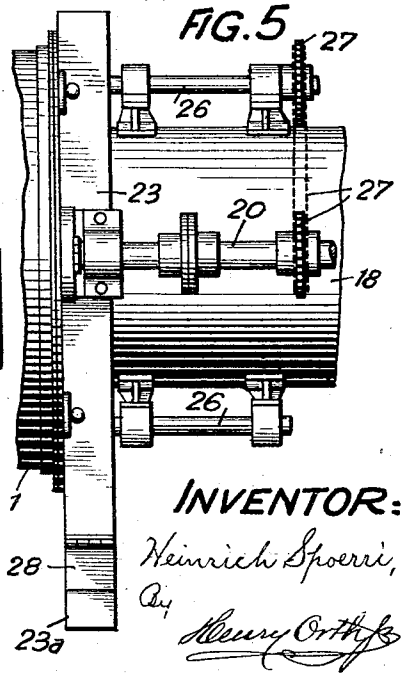


FIG. 5



INVENTOR:

Heinrich Spoerri,

By Henry Orth & Co

Atty

Patented Nov. 17, 1931

1,832,148

UNITED STATES PATENT OFFICE

HEINRICH SPOERRI, OF ZURICH, SWITZERLAND

DEVICE FOR SLAKING LIME

Application filed February 8, 1930, Serial No. 426,915, and in Switzerland December 23, 1929.

This invention relates to a device for slaking lime in two phases for the first of which a sieve drum having several screen coverings is provided and for the second phase a raking contrivance.

According to the invention the operation of a device of this type is improved in that in the passageway from the casing of the sieve drum to that of the raking contrivance the latter casing being smaller in diameter than the former and independent of the same, an appliance for the automatic separation of coarse-grained unslaked pieces of lime as well as ingredients which are indissoluble in water is arranged.

In the accompanying drawings an embodiment of the invention is illustrated in which:

Fig. 1 is a longitudinal elevation of the device;

Fig. 2 is a front elevation of the same;

Fig. 3 shows a longitudinal section of a part of the machine, on a larger scale;

Fig. 4 is a section through the device between the two casings;

Fig. 5 is a top plan view of a detail, and

Fig. 6 a schematic illustration of a modified pipe arrangement for the water supply to the various slaking positions.

The device illustrated substantially consists of the following main component parts: The unit S containing the sieve drum for the first slaking phase, the unit R containing the raking contrivance for the second slaking phase, the condensation flue K and the driving gear V.

In the sieve drum casing 1 the plural-sieve drum 2 is mounted which is composed of an exterior screen covering 2*a* extending through the entire casing and an interior, shorter screen covering 2*b* the latter at the feed end being flush with the former and at the delivery end open. Both screen coverings are of different mesh gauge and are rigidly interconnected. The interior screen covering is secured to an inner spoke system 3 the nave of which being fixed to the driving shaft 4, whilst the exterior screen covering, at the feed end, is provided with an annular bearing strip to cooperate with two supporting rollers 12 placed underneath the casing. The outer circumference of the screen covering 2*a* is provided with a conveyor worm 5 which conducts the material passing through the exterior sieve drum to the outlet 1*a* of the casing 1. To the opposite end of the casing the feed chute 1*b* is mounted which leads the lime to the interior sieve drum. Further two parallel spray pipes 6, 6*a* are passed through the feed chute to the interior of the drum and another pipe 7 enters the drum from the other end of the casing. On the upper part of the casing 1 of the sieve drum a transverse tube 8 communicating with the said casing and carrying the condensation flue K is mounted. The casing 9 of the latter has a lower part 9*a* and a somewhat narrower upper part 9*b*. The lower part 9*a* into which extends the concentric delivery duct 10 covered by a hood is provided with a steep bottom to the lower end of which the sludge conduit 11 is connected which serves for the removal of the sludge sliding down on the inclined bottom. A waste pipe 11*a* extending into the annular space between the cylindrical wall 9*a* and the delivery duct 10 also communicates with the said sludge conduit. In the upper part 9*b* of the condensation flue in usual manner spray nozzles 13 are inserted which are connected to the fresh water supply pipe 14. A branch 14*a* of the fresh water pipe leads to the inlet funnel of the slaking spray pipe 6*a* and further branches thereof to the slaking spray pipe 7 of the sieve drum as well as to the slaking spray pipe 15 of the raking contrivance, whereby in each branch pipe a control member is provided. A water discharge pipe 17 extending into the lower part 9*a* of the condensation flue but not as high up as the waste pipe 11*a* leads to the slaking pipe 6 of the sieve drum and as the said water is preheated by the exhaust gases from the slaking process in the condensation flue, at will, either preheated or cold water may be used for the slaking. The arrangement of inlet funnels on the slaking spray pipes permits of a continuous control of the water feed.

The casing 18 of the raking contrivance R is connected to the casing 1 of the sieve drum appliance S in a lower position relatively

thereto and consists of a slender cylinder of a substantially smaller diameter than the casing of the sieve drum. In the casing 18 the paddle shaft 19 for the raking contrivance is mounted which is driven by means of a chain drive 21 from a driving shaft 20 which is longitudinally mounted above the casing 18 so as to form the continuation of the driving shaft 4. On the feed end of the contrivance the paddle arm 22 is carried on the free end of the shaft 19 which arm serves for conveying the material issuing from the outlet 1*a* towards the paddles of the raking contrivance. In the front part of the casing of the raking contrivance a slaking spray pipe 15 is provided which is supplied from the fresh water pipe 14. Between the casing of the sieve drum and that of the raking contrivance a transversely extending chamber 23 is disposed, the said chamber having a lateral outlet 23*a* which is arranged above the outlet of the sieve drum casing. In the transverse chamber, the lower part of which where it extends through the casing of the raking contrivance is perforated, and laterally of the sieve drum, two chain wheels 24 are arranged over which passes a scraping chain 25 the scraping members of which are provided with an oblique edge which is parallel to the small inclination of the downwardly deflected lower wall of the transverse chamber, the said scraping members serving for removing larger unslaked pieces of lime and foreign stone particles laterally out of the outlet 23*a* which pass from the sieve drum to the transverse chamber directly behind the latter. The shafts 26 of the chain wheels 24 project from the transverse chamber so as to permit to be mounted outside of the same and one of the said shafts is driven by means of a chain drive 27 from the shaft 20 (see Fig. 5). A lateral flap 28 on the transverse chamber 23 permits of introducing a lime rake or the like for removing stones that should get jammed by the scraping chain. The slaked lime leaves the casing of the raking contrivance through the outlet 18*a* at the end of the said casing.

The water issuing from the jets in the condensation flue, for condensing the steam and entraining the dust, having thus been heated and flowing from the discharge pipe 17 as lime milk can be used for the slaking such as it is or mixed with fresh water, and it is obvious that fresh water alone may also be used for the slaking. Alternatively, branch conduits may be arranged for admitting water, which is preheated in the condensation flue, to the discharge end portion of the sieve drum as well as to the second slaking phase i. e. the raking contrivance.

An arrangement of this kind is shown in Fig. 6 wherein the fresh water supply pipe 14 including the valve 36 is connected to each of the different conduits 30, 31, 32 leading to the three slaking positions 6, 7 and 15 through the intermediary of a three-way-valve 33, 34, 35 respectively, the said conduits being in turn connected to the discharge pipe 17 of the condensation flue. This arrangement permits of either supplying the said three slaking positions with preheated or cold water or any suitable mixture of both depending on the adjustment of the valves 30, 31, 32 and 36.

Owing to the condensation flue being provided with an enlarged lower part and a decreased upper part an effective draught is induced in the said flue and the oblique bottom thereof ensures the discharge of the lime sludge, thus preventing hardening of the same.

I claim:

1. In a device for slaking lime in two phases, the combination with, a sieve drum appliance for the first phase, a raking contrivance for the second phase, the said raking contrivance being of smaller diameter than the said sieve drum appliance and independent of the same, a passageway for the lime to be treated between the said sieve drum appliance and the said raking contrivance, of an arrangement disposed at the said passageway for the automatic and positive removal of coarse-grained unslaked pieces of lime as well as of admixtures indissoluble in water.

2. In a device for slaking lime in two phases, the combination with, a sieve drum appliance, for the first phase, an outer casing for the said appliance, an exterior screen covering extending through the entire casing, an interior screen covering, the said interior screen covering being concentric with the said exterior screen covering and shorter in length than the same and rigidly connected thereto, the ends of the said screen coverings being flush at the feed end of the appliance, a main driving shaft, a spoke system arranged on the said main driving shaft and carrying the said interior covering, a conveyor worm, the said conveyor worm being positioned on the exterior circumference of the said exterior covering, an annular bearing strip, two supporting rollers, the said supporting rollers extending into the said casing and cooperating with the said bearing strip for imparting the drive to the said exterior screen covering, a raking contrivance for the second phase, the said raking contrivance being of smaller diameter than the said sieve drum appliance and independent of the same, a passageway for the lime to be treated between the said sieve drum appliance and the said raking contrivance, of an arrangement disposed at the said passageway for the automatic positive removal of coarse-grained unslaked pieces of lime as well as of admixtures indissoluble in water.

3. In a device for slaking lime in two phases, the combination with, a sieve drum

appliance for the first phase, a condensation flue situated above said sieve drum appliance and serving for the wet precipitation of the exhaust steam and the lime dust, an enlarged lower portion on the said condensation flue, a waste pipe, the said waste pipe extending into the said lower portion of the said flue, a narrower upper portion on the said flue, spray nozzles arranged inside of the said upper portion, a delivery duct inserted into the said lower portion of the said condensation flue so as to form an annular space with the wall of the said lower portion, a pipe for the discharge of the preheated water and extending into the said annular space and providing a preheated waste water supply for slaking purposes, a raking contrivance for the second phase, the said raking contrivance being of smaller diameter than the said sieve drum appliance and independent of the same, a passageway for the lime to be treated between the said sieve drum appliance and the said raking contrivance, of an arrangement disposed at the said passageway for the automatic positive removal of coarse-grained unslaked pieces of lime as well as of admixtures indissoluble in water.

4. In a device for slaking lime in two phases, the combination with, a sieve drum appliance for the first phase, a condensation flue situated above the said sieve drum appliance and serving for the wet precipitation of the exhaust steam and the lime dust, an enlarged lower portion on the said flue, an inclined bottom on the said flue so as to permit the sludge to slide down on the said incline, a discharge conduit for the said sludge connected to the said bottom at the lower end thereof, a waste pipe extending into the said lower portion of the said flue and connected with its lower end with the said discharge conduit for the sludge, a narrower upper portion on the said flue, spray nozzles arranged inside of the said upper portion, a delivery duct inserted into the said lower portion of the said condensation flue so as to form an annular space with the wall of the said lower portion, a pipe for the discharge of the preheated water and extending into the said annular space and providing a preheated waste water supply for slaking purposes, a raking contrivance for the second phase, the said raking contrivance being of smaller diameter than the said sieve drum appliance and independent of the same, a passageway for the lime to be treated between the said sieve drum appliance and the said raking contrivance, of an arrangement disposed at the said passageway for the automatic positive removal of coarse-grained unslaked pieces of lime as well as of admixtures indissoluble in water.

5. In a device for slaking lime in two phases, the combination with, a sieve drum appliance for the first phase, an outlet provided in the said sieve drum appliance, a raking contrivance for the second phase, the said raking contrivance being of smaller diameter than the said sieve drum appliance and independent of the same, a passageway for the lime to be treated between the said sieve drum appliance and the said raking contrivance, positive transfer means in said passageway, of a transverse chamber placed in the said passageway above the said outlet in the said sieve drum appliance, two chain wheels mounted in the said transverse chamber, a scraping chain passing round the said chain wheels and removing the unslaked pieces of lime and foreign stone particles, arriving at the said transverse chamber from the said sieve drum appliance through a lateral outlet in the said transverse chamber.

6. In a device for slaking lime in two phases, the combination with, a sieve drum appliance for the first phase, an outer casing for the said sieve drum appliance, an outlet provided in the said sieve drum appliance, a raking contrivance for the second phase, an outer casing for the said raking contrivance, the casing of the said raking contrivance being of smaller diameter than the casing of the said sieve drum appliance and independent of the same, a main driving shaft for the said sieve drum appliance, a driving shaft for the said raking contrivance extending lengthwise over the said casing of the said contrivance so as to form the continuation of the said main driving shaft, a chain drive, a shaft for the actuation of the paddles of the said raking contrivance, the said chain drive being arranged between the said driving shaft for the said contrivance and the said shaft for the actuation of the paddles thereof and disposed at the end of the casing for the said contrivance, a passageway for the goods to be treated between the said sieve drum appliance and the said raking contrivance, of a transverse chamber placed in the said passageway above the said outlet in the said sieve drum appliance, two chain wheels mounted in the said transverse chamber, a shaft for each chain wheel, the said shafts projecting out of the said transverse chamber, a further chain drive arranged between one of the said chain wheel shafts and the said driving shaft for the said raking contrivance, a scraping chain passing round the said chain wheels and removing the unslaked pieces of lime and foreign stone particles arriving at the said transverse chamber from the said sieve drum appliance, through a lateral outlet in the said transverse chamber.

In testimony whereof I have signed my name to this specification.

HEINRICH SPOERRI.