

No. 785,725.

PATENTED MAR. 28, 1905.

L. E. FISHACK.  
LIME DIGESTER.

APPLICATION FILED FEB. 17, 1904.

FIG. 2.

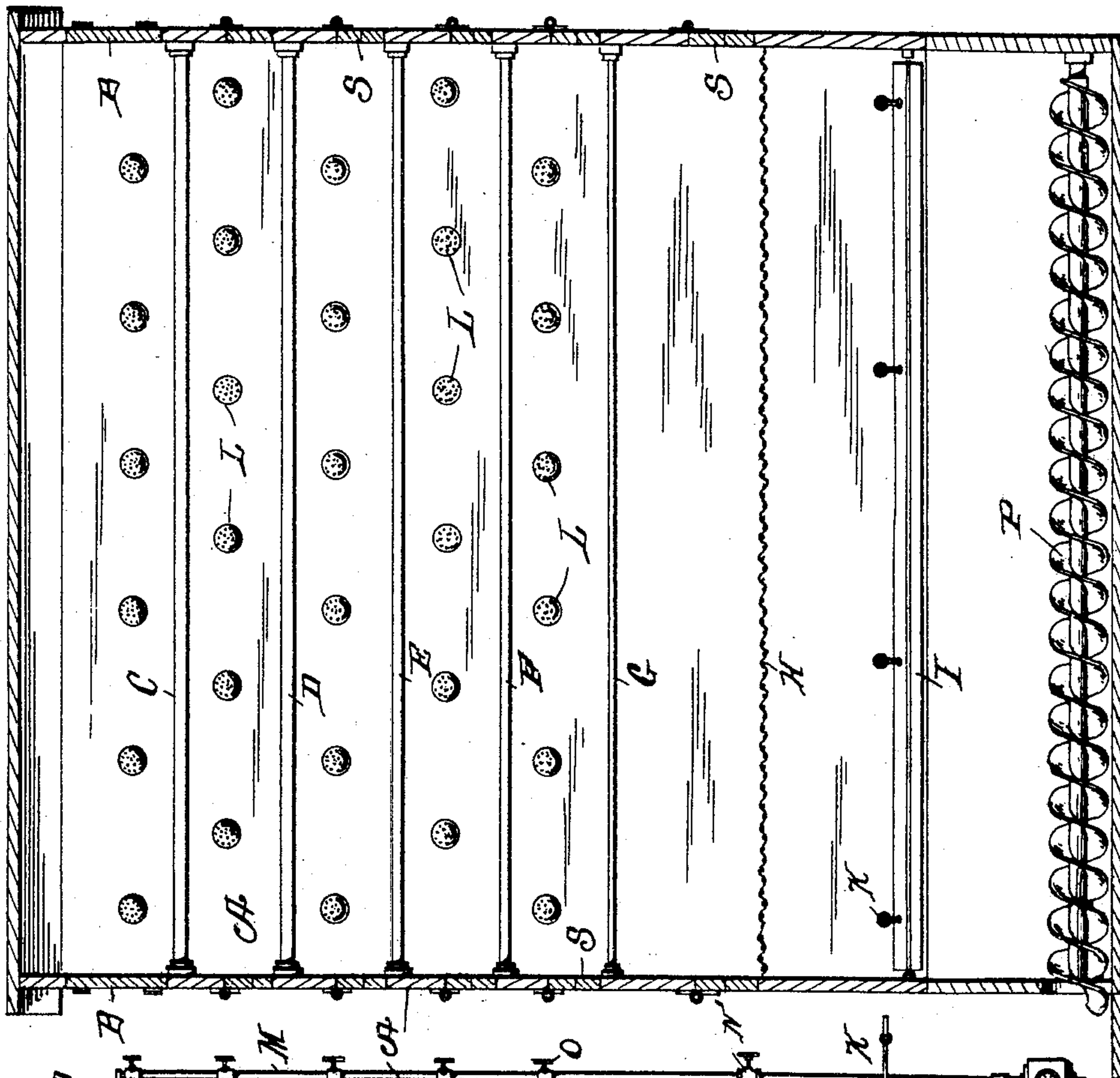
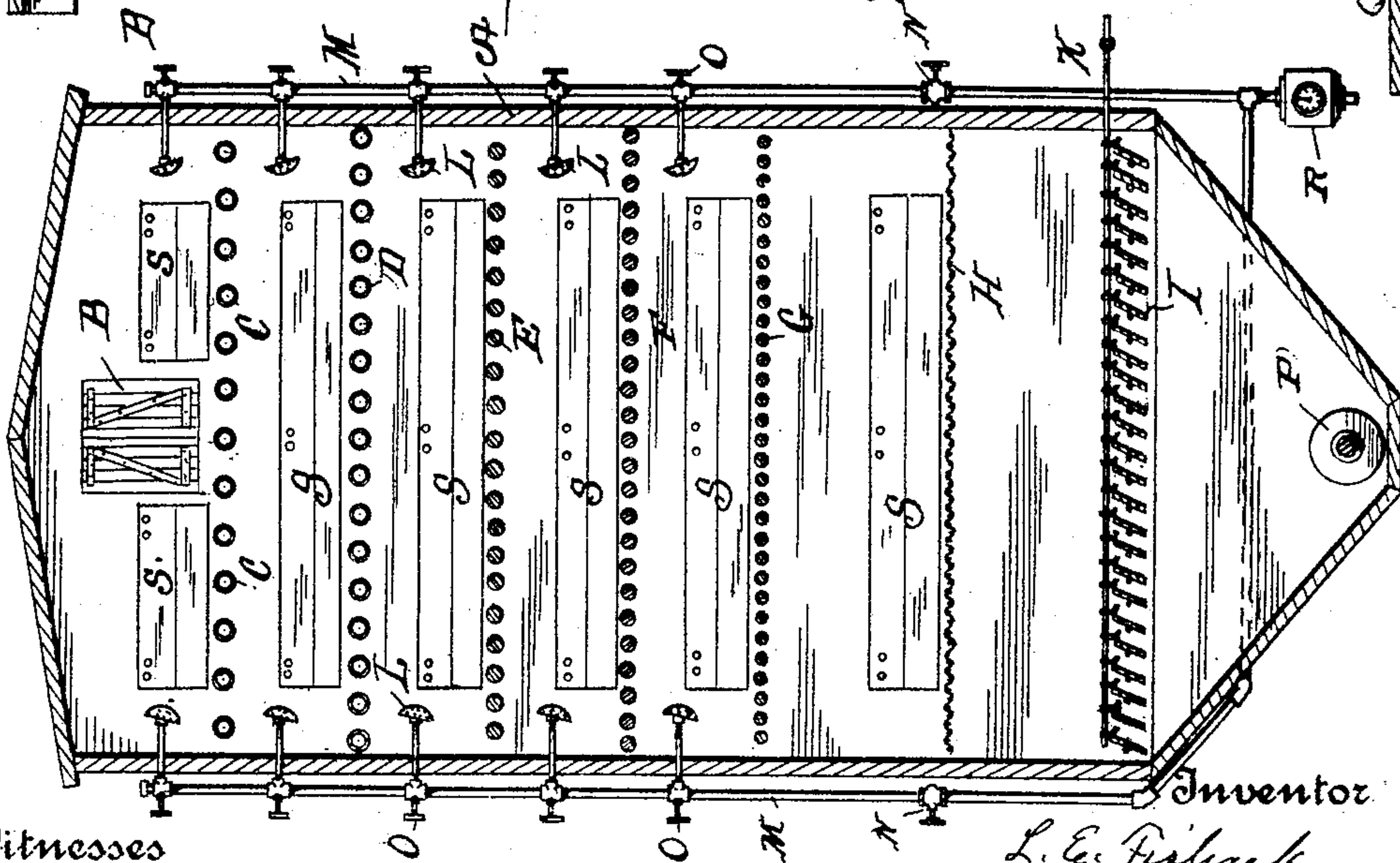


FIG. 1.



Witnesses  
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# UNITED STATES PATENT OFFICE.

LINCOLN E. FISHACK, OF TOLEDO, OHIO.

## LIME-DIGESTER.

SPECIFICATION forming part of Letters Patent No. 785,725, dated March 28, 1905.

Application filed February 17, 1904. Serial No. 193,941.

*To all whom it may concern:*

Be it known that I, LINCOLN E. FISHACK, 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-Digesters, of which the following is a specification.

This invention relates to digesters for hydrating lime.

The object of the invention is to produce a mechanical structure by means of which water can be conveyed to lump-lime (oxid of calcium) in regulated quantities, so that the lime will be hydrated evenly and perfectly.

The invention consists in a mechanical structure provided with gratings of different sizes and character, means for supplying water in regulated quantities thereto, means for entering the lime therein and for removing the hydrated lime therefrom, and auxiliary apparatus for conveniently removing impurities.

The drawings indicate in a general way the construction of the digester, but do not indicate the proportions.

Figure 1 is a vertical cross-section of my lime-digester or slaking-house. Fig. 2 is a longitudinal section of the same.

A indicates the shell or body of the digester. This may be made of any suitable material and is preferably lined with some substance not readily attacked by alkali, such as tiles, sheet metal, or the like. The shell is practically closed when in operation. The upper part of this shell or body is provided with suitable openings, as B, through which lump-lime may be introduced.

The uppermost grating C is preferably formed of pipes, say one inch in diameter and three inches apart; but these dimensions are not essential, the desired object being attained when a coarse grating is provided which will support large lumps of lime and permit small lumps to pass between the grate-bars. A second grating D is provided at a little distance under grating C. Grating D has smaller bars or pipes, and they are closer together than the pipes or bars in the grating C. A third grating E is provided at a suit-

able distance under grating D, and a fourth grating F and a fifth grating G are shown, each being finer than the one above it. A suitable vertical height between the gratings may be about two feet. These gratings or grids consist of parallel bars, without cross-bars, so that any debris on the bars may be raked longitudinally thereof without obstruction and without the grinding action which takes place when such material is drawn over a cross-bar grating. A wire-mesh grating or sieve H is placed below the lower grating G, and below this is a floor I, composed of pivoted slats, which slats may be turned, as by draw-rod K, and thus make an open grating or a closed floor.

At suitable intervals in the sides of the digester there are a number of sprinklers L. These sprinklers are connected to water-supply pipes M, which pipes have controlling-valves N. The sprinklers L may also have separate controlling-valves O, although generally all the sprinklers will be open and the entire water-supply will be controlled from one or two points. The water-pressure should be regulated so as to secure a pretty even distribution of water onto the lime on the gratings.

Below the floor I the digester is preferably of hopper form, so that material falling from above may be carried out of the digester by a suitable conveyer P.

The water-supply to pipes M preferably passes through a meter R or other means for determining the exact quantity used. Different varieties of lump-lime require different quantities of water for perfect hydration. A preliminary or experimental test having been made to ascertain the requisite quantity of water for the hydration of any particular kind of lime, the lime is placed in the digester. Large lumps will remain on the upper grating and the finer lime will fall through, some of it to the slatted floor I, which is closed at the time. Then water is admitted and the lime on the different gratings is wetted thereby. As soon as the lime begins to slake it heats the water and forms steam, and the steam reaches the surface of all the lumps of lime, which begins to disintegrate and fall through



the gratings, and as the water-supply continues the hydration becomes complete. As there is no excess of water in any part of the digester, none of the lime is burned or left unslaked, and an exceedingly even dry hydrate of lime may be obtained. The water may be cut off at any time and the supply renewed until just the proper amount is supplied to hydrate the mass of lime measured or weighed into the digester. When the entire quantity of lime is hydrated, it will be in form of a dry powder resting on slatted floor I and can be there dumped and conveyed out by the conveyor to be screened or to the place of use. Should there be stones or impurities in the lump-lime, these will not disintegrate during the slaking process and will remain on the gratings. Doors S are provided just above the several gratings, and such impurities can be raked out of the doors after the lime hydrate has been removed. If any dry lime should remain on the gratings, a shaking or jarring of the gratings or bars will cause this to fall down. One batch after another may be hydrated in a digester of this kind with such frequency that the process is almost continuous.

What I claim is—

1. In a lime-digester, an inclosing shell or casing, a series of gratings of increasing fineness from the top toward the bottom arranged within the casing, and sprinklers arranged to direct a spray on the lime as it falls from grating to grating, all combined.

2. In a lime-digester, an inclosing shell or casing, a series of gratings consisting of parallel bars without cross-bars arranged within the casing, the gratings increasing in fineness toward the bottom of the digester, and means for conveying a spray to the lime on the gratings, all combined.

3. In a lime-digester, an inclosing shell or casing, a series of gratings within the casing and increasing in fineness toward the bottom, openings in the casing at the end of each grating whereby debris may be removed, and

means for introducing water to the lime on the gratings, all combined.

4. In a lime-digester, the combination of an inclosing casing, a series of gratings in the casing increasing in fineness toward the bottom, means for introducing water in regulated quantities to lime on the gratings, and means for removing slaked lime from the bottom of the digester.

5. In a lime-digester, an inclosing shell or casing, a series of gratings of increasing fineness toward the bottom and inclosed in said casing, a hopper at the bottom and a conveyor in said hopper, and means for supplying water in regulated quantities to lime on the gratings.

6. In a lime-digester, an inclosing casing, a series of gratings in said casing increasing in fineness toward the bottom, means for supplying water in regulated quantities to lime on the gratings, a flooring of pivoted slats below the gratings and means for turning said slats, and a hopper below said flooring, all combined.

7. An organized structure for digesting lime, consisting of a casing or housing to substantially prevent escape of steam, a series of gratings increasing in fineness toward the bottom and inclosed in said casing or housing, and means for feeding water in regulated quantities to lime resting on said gratings; all combined.

8. An organized structure for digesting lime, consisting of a casing or housing to confine steam to a considerable extent therein, a series of gratings within the casing, means for removing slaked lime from below the lower grating, and means for feeding water in regulated quantities to the lime on the gratings, all combined.

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

LINCOLN E. FISHACK.

Witnesses:

WALTER W. FISHACK,  
DAVID W. LOVEJOY.