A. SCHÄFFER & A. SCHRÖDER.

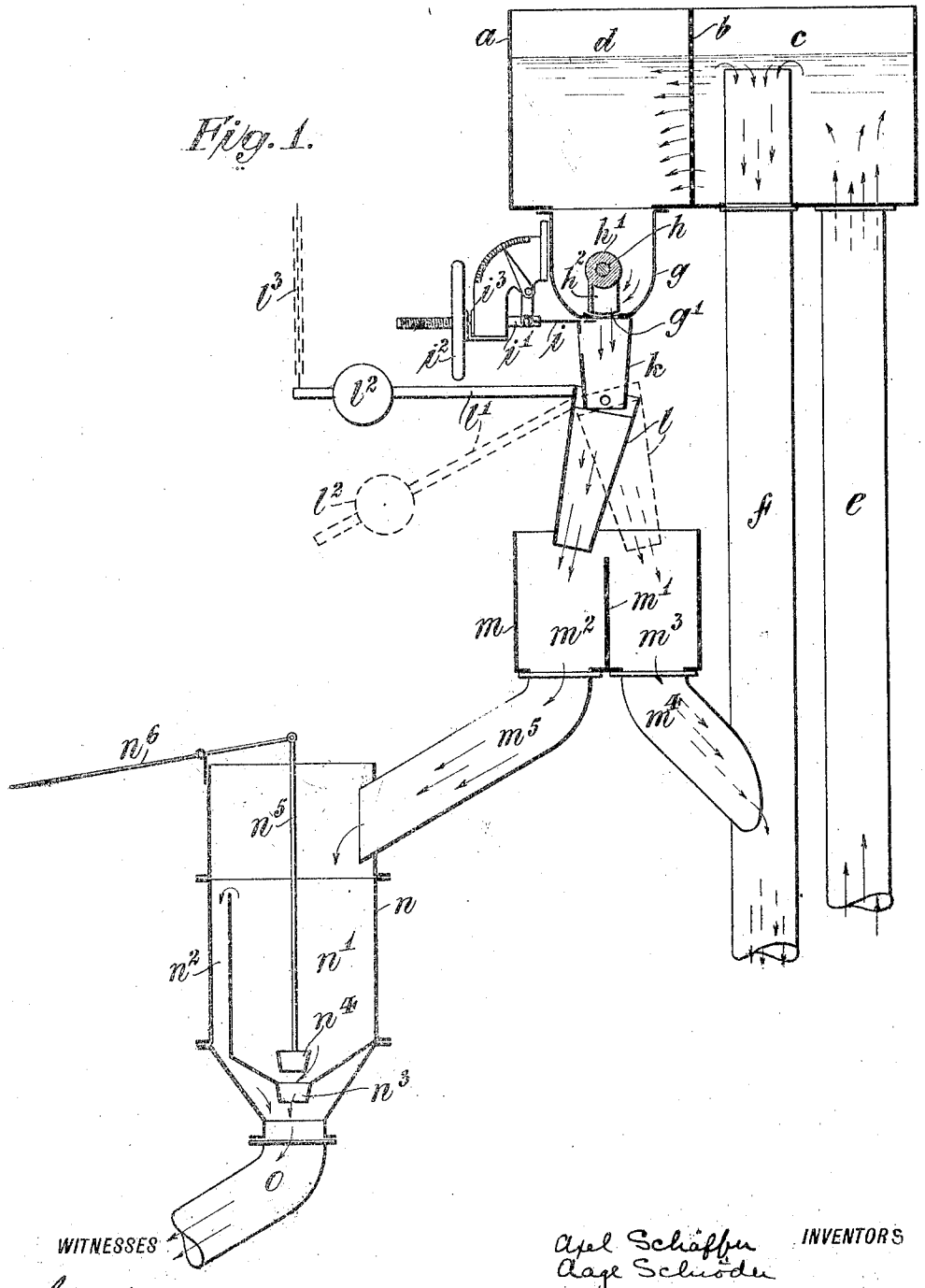
APPARATUS FOR FEEDING SEMILIQUID MATERIALS.

APPLICATION FILED FEB. 21, 1912.

1,082,287. Patented Dec. 23, 1913.

2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

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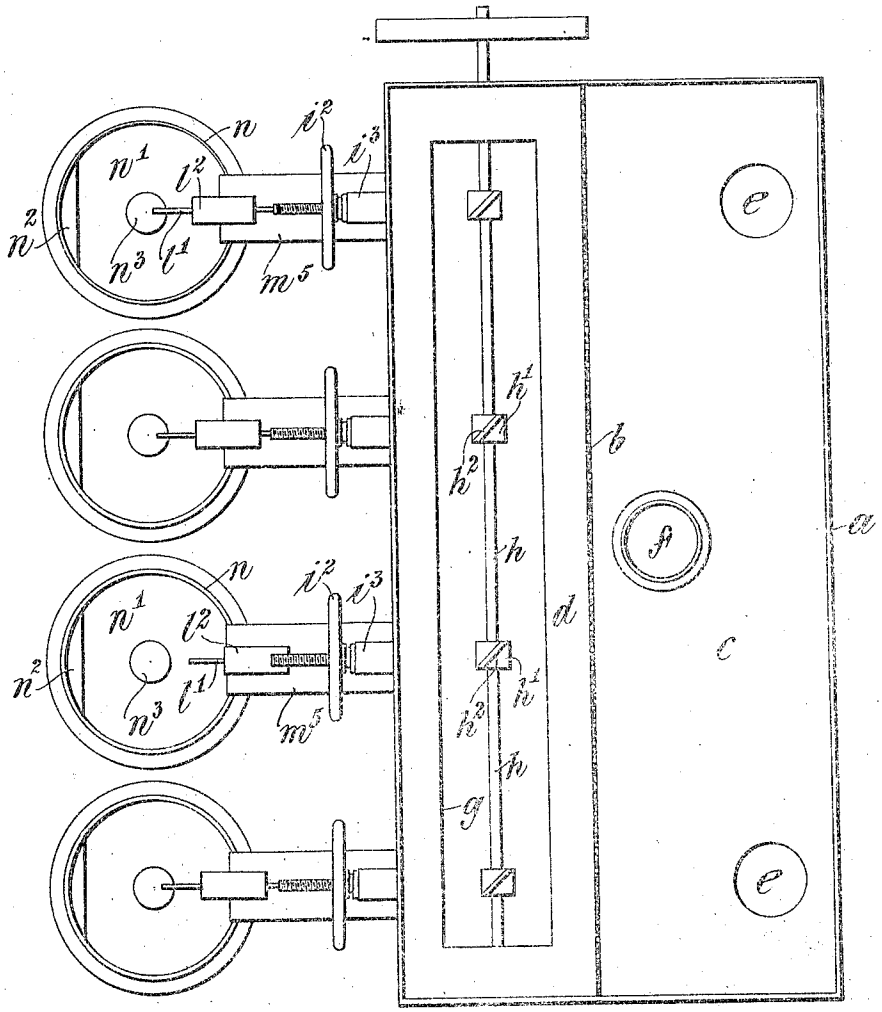
2 SHEETS—SHEET 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR FEEDING SEMILIQUID MATERIALS.

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Application filed February 21, 1912. Serial No. 679,065.

To all whom it may concern:

Be it known that we, AXEL SCHÄFFER and AAGE SCHRÖDER, subjects of the King of Denmark, residing in Copenhagen, Denmark, have invented certain new and useful Improvements in Apparatus for Feeding Semiliquid Materials, of which the following is a specification, reference being had to the accompanying drawings, which form a part hereof.

In the manufacture of Portland cement by the use of the wet process in the preparatory treatment of the raw material it is very desirable that the slurry, or raw material in a thick, creamy condition, shall be fed into the kilns with a degree of uniformity which it has been very difficult to attain with the feeding devices heretofore employed.

It is therefore the object of this invention to provide an improved apparatus by which the slurry shall be fed into one or more kilns with uniformity, while at the same time the feed can be discontinued or renewed instantly without interfering with or changing the adjustment of the feed regulating devices when they have once been set for the desired rate of feed.

Although the invention has been devised with especial reference to the feeding of slurry it will nevertheless be apparent that the improved apparatus is capable of application to the feeding of any semi-liquid material for any purpose.

The invention will be more fully explained hereinafter with reference to the accompanying drawings in which it is illustrated and in which—

Figure 1 is a view partly in elevation and partly in vertical section showing an apparatus designed for the feeding of slurry which embodies the invention. Fig. 2 is a top view of the apparatus shown in Fig. 1.

At a convenient point, suitably elevated above the devices to which the slurry or other semi-liquid material is to be fed, is located a tank *a* of suitable capacity which is divided longitudinally by a perforated partition or screen *b* to form a receiving compartment *c* and a discharging or distributing compartment *d*. The slurry is delivered to the receiving compartment *c*, preferably in an amount slightly in excess of the discharge from the compartment *d*, by a feed pipe *e* from any suitable source. The feed pipe *e* terminates in the bottom of the compartment *c*, while an overflow pipe *f* is extended upward through the bottom of the compartment *c* to a suitable height above the bottom so that the excess of slurry which is supplied to the compartment *c* may return to the source of supply through the pipe *f* and the volume of slurry in the receiving chamber *c* be maintained thereby at a substantially uniform height and flow at a uniform rate through the screen *b*, the larger hard masses being retained in the compartment *c*. Any desired number of feed pipes and overflow pipes may be provided, two feed pipes and one overflow pipe being shown in Fig. 2.

At the bottom of the distributing compartment *d* is placed a distributing trough *g* which is provided in its bottom with one or more feed openings *g'* (shown in Fig. 1) of any suitable shape and size. In the end walls of the trough *g* is mounted a shaft *h*, which may be rotated by any suitable means and is armed, for each feed opening *g'*, with a hub *h'* which carries an obliquely set blade h^2. The edge of each blade h^2 is arranged to sweep across the corresponding opening *g'*, close to the bottom of the trough, so that such opening is kept free and prevented from being closed by the lodgment of solid masses in the opening. Each opening *g'* is also provided with a valve *i* for varying the effective area of the opening and so regulating the feed therethrough. In the construction shown the valve *i* is a slide valve carried by a screw threaded stem i' on which is mounted a hand-wheel i^2 for adjusting the valve. An indicator i^3 may be connected to each valve to show its relative position.

The funnel *k* below each opening conducts the material which is delivered therefrom to a swinging nozzle *l* which may be pivotally hung upon the funnel *k*. An arm *l'* secured to the nozzle *l* may have a sliding weight l^2 and may have connected thereto a chain l^3 so that the nozzle can be swung in one direction or the other from a distant point, such as the firing end of a rotary kiln. The material is delivered by the nozzle *l* into a tank *m* which is divided by a partition *m'* to form two compartments m^2 and m^3. The compartment m^3 is connected by a pipe m^4 with the overflow pipe *f* so that when the nozzle *l* is swung so as to direct the material into the compartment m^3 such material will be returned to the source of supply from which the compartment *c* of

the tank a is fed. The compartment m^2 of the tank m is arranged to deliver the material through a pipe m^5 into a tank n which is provided with a measuring vessel n' and an overflow passage n^2. The measuring vessel n' has in its bottom a discharge opening n^3 for which is provided a valve n^4 carried by a rod n^5 which is connected to the operating lever n^6. The material received in the tank n, whether it passes through the overflow passage n^2 or through the outlet n^3 of the measuring vessel, is delivered through a discharge pipe o to the kiln or other place of deposit of the slurry or other material. The measuring vessel is provided in order that the rate of flow of the material may be determined at any time, for by closing the opening n^3 by the valve n^4 and noting the time required for the filling of the measuring vessel n' the volume of the material delivered in a given time, that is, the rate of flow can be measured readily.

The operation of the device will now readily be understood. The slurry or other material is delivered through the feed pipe e into the receiving compartment c at a rate of flow somewhat greater than is required and as soon as the material accumulates in the tank a to the height of the top of the overflow pipe f the excess of material, above that required, will overflow through the pipe f and return to the source of supply. The screen b permits the passage of only that portion of the material which is of proper consistency and prevents the passage of hard masses, dirt and foreign substances which might tend to clog the openings g' of the distributing trough and change the rate of flow. When the material in the equalizing tank a has reached the height of the overflow pipe f a constant head is thereafter maintained and consequently a constant rate of flow from the distributing trough. Each of the openings g' can be varied by its respective valve i to regulate the rate of flow therefrom to the corresponding kiln or other place of deposit of the material according to requirements. As already described, the rate of flow can be measured at any time in the tank n without causing more than a brief intermission of the flow and without varying the amount of flow in a given period of time. If it is desired at any time to discontinue the feed to a certain kiln, for example, the chain l^3 is released and the weight l^2 on the arm l' then acts to swing the nozzle so as to direct the flow of the material away from the compartment m^2 and into the compartment m^3 of the tank m from which it returns by way of the pipe m^4 and the pipe f to the source of supply. The feed may be restored instantly by again raising the weighted arm l' and causing the nozzle l to direct the material again into the compartment m^2.

It will be understood that the apparatus may be arranged for delivery of material to one or several kilns or points of deposit and that the form and proportions of the various parts of the apparatus may be varied to suit different conditions of use. The invention, therefore, is not restricted to the particular construction and arrangement shown and described herein.

We claim as our invention:—

1. Apparatus for feeding semi-liquid materials comprising a tank, means to supply the material to said tank and to maintain it at a uniform height, a discharge trough in connection with the tank having a series of discharge openings therein, a shaft having a series of blades to sweep across said discharge openings, and means to conduct the material from said discharge openings to the places of use.

2. Apparatus for feeding semi-liquid materials comprising a tank, a supply pipe for said tank, an overflow pipe extended upward into said tank, said tank having a discharge opening, a swinging nozzle to receive the material from said discharge opening, and a plurality of receptacles into which the material may be discharged by said swinging nozzle, one of said receptacles being connected to said overflow pipe.

This specification signed and witnessed this 3rd day of February A. D., 1912.

AXEL SCHÄFFER.
AAGE SCHRÖDER.

Signed in the presence of—
CHR. ENGELHART,
WILH. OLSEN.