(No Model.) 2 Sheets—Sheet 1.

L. D. ARMSTRONG, Dec'd.

M. M. ARMSTRONG, Administrator.

APPARATUS FOR RECLAIMING SODA ASH.

No. 480,702. Patented Aug. 16, 1892.

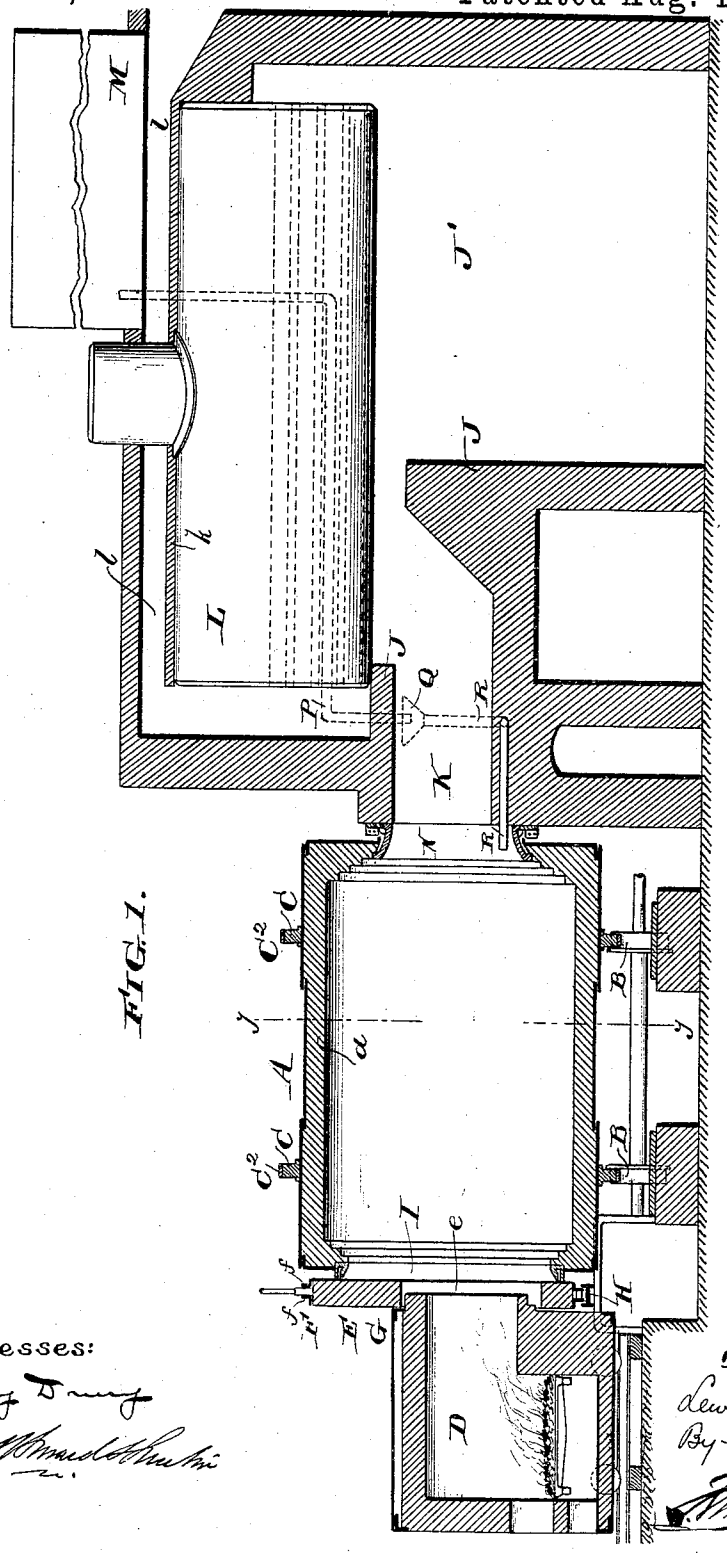

FIG. 1.

Witnesses:
Henry Dewey
Wm. H. Hamilton

Inventor:
Lewis D. Armstrong
By his attorney
Wm. H. Hamilton

(No Model.) 2 Sheets—Sheet 2.

L. D. ARMSTRONG, Dec'd.

M. M. ARMSTRONG, Administrator.

APPARATUS FOR RECLAIMING SODA ASH.

No. 480,702. Patented Aug. 16, 1892.

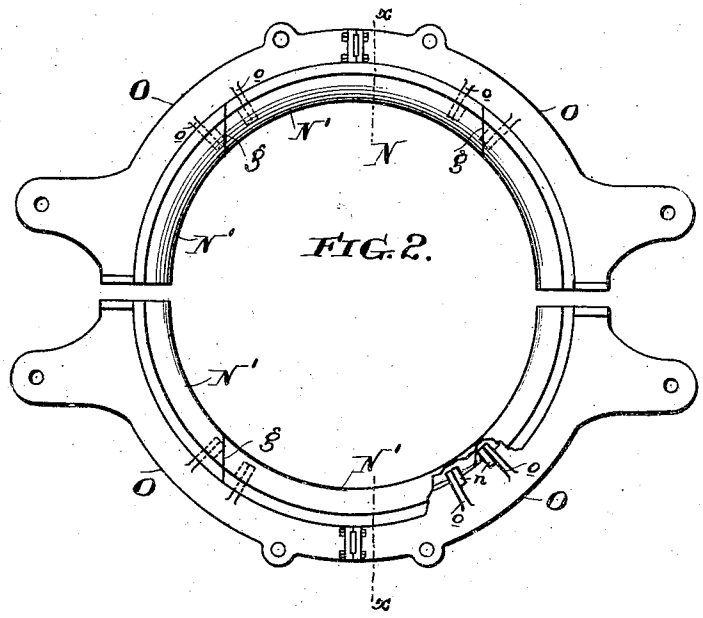

FIG. 2.

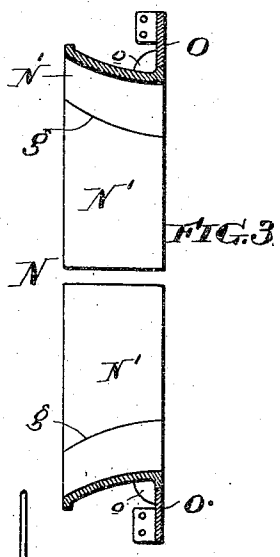

FIG. 3.

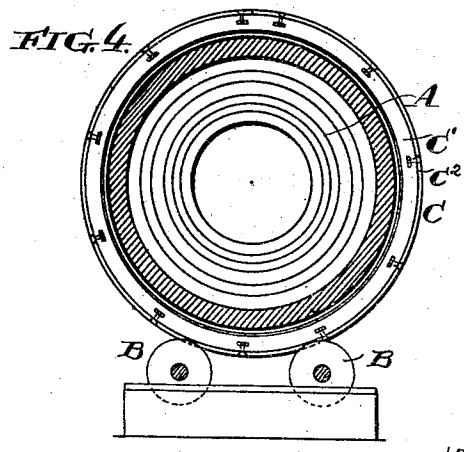

FIG. 4.

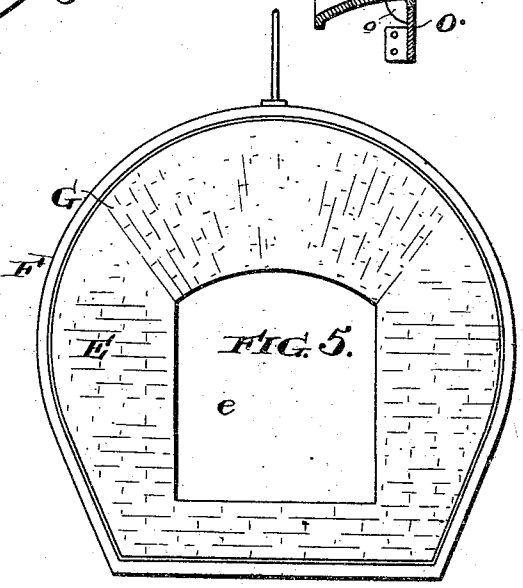

FIG. 5.

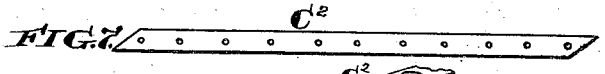

FIG. 7.

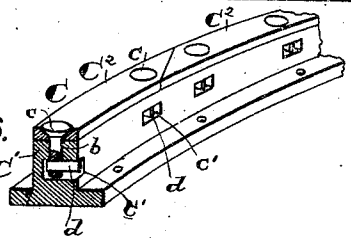

FIG. 6.

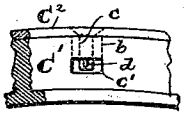

FIG. 8.

Witnesses:
Henry Drury
Wm. Edmund Church

Inventor:
Lewis D. Armstrong
By his attorney
Thos. Church

UNITED STATES PATENT OFFICE.

LEWIS D. ARMSTRONG, OF LOCK HAVEN, PENNSYLVANIA; MEYLERT M. ARMSTRONG, ADMINISTRATOR OF LEWIS D. ARMSTRONG, DECEASED, ASSIGNOR TO THE NEW YORK AND PENNSYLVANIA COMPANY, OF PENNSYLVANIA.

APPARATUS FOR RECLAIMING SODA-ASH.

SPECIFICATION forming part of Letters Patent No. 480,702, dated August 16, 1892.

Application filed June 20, 1891. Serial No. 396,886. (No model.)

To all whom it may concern:

Be it known that I, LEWIS D. ARMSTRONG, of Lock Haven, in the county of Clinton and State of Pennsylvania, have invented an Improvement in Apparatus for Reclaiming Soda-Ash, of which the following is a specification.

My invention relates to apparatus for reclaiming soda-ash; and it consists of certain improvements which are fully set forth in the following specification and shown in the accompanying drawings, which form a part thereof.

The object of my invention is to effectively accomplish the evaporation of liquids from liquors for the purpose of recovering chemicals contained therein, with particular reference to the recovery of soda-ash from the spent liquors of pulp-mills, &c.

My invention relates to certain improvements in the construction and arrangement of the parts, whereby greater economy and efficiency are obtained.

My invention also contemplates the employment of the products of combustion from the rotary incinerator for the purpose of generating steam in a steam-boiler, and also the utilizing of those products for the purpose of subjecting the liquor contained in the supply-tank to heat before its introduction into the incinerator.

My invention includes certain improvements in the rotary incinerator or cylinder for the purpose of imparting rotation to it, and in the devices for leading the products of combustion to and from the rotary cylinder.

In the drawings, Figure 1 is a sectional side elevation of my improved apparatus for reclaiming soda-ash, &c. Fig. 2 is a front elevation, on an enlarged scale, of the bell mouthpiece with its parts partially detached. Fig. 3 is a vertical sectional view of the same on the line x x of Fig. 2. Fig. 4 is a front elevation of the movable shield located between the fire-box and cylinder. Fig. 5 is a vertical sectional view of the rotary cylinder on the line y y of Fig. 1. Fig. 6 is a perspective view of a portion of the driving-ring of the cylinder on an enlarged scale. Fig. 7 is a plan view of the rim thereof, and Fig. 8 is a plan view of a portion of the driving-ring.

A is a rotary incinerator, which may be constructed in the usual manner of sheet metal with an interior lining a of fire-brick.

C C are metallic rings upon the exterior of the rotary incinerator. These rings C C are supported upon the driving-wheels B B. The wheels B B are driven in any convenient well-known manner, and the rotary incinerator A is rotated by the friction between the rings C C and the driving-wheels B, thus obviating the employment of the usual gearing. These rings C C are preferably constructed of integral rings C′, bolted to the metal shell of the cylinder and provided with a steel rim C^2. This steel rim C^2 is formed in sections bolted to the metal ring C′ by counter-sunk bolts c, which extend through slots b in the ring C′ and are fastened therein by pins d, inserted through lateral slots c' in the rim C^2 into the bolts c.

By the construction of the rings C C with a cast-iron body C′ and steel rim C^2 great economy and efficiency are obtained. By reason of the great weight of the cylinder A the rim of these driving-rings becomes greatly worn, rendering it necessary to renew the rings. With this construction, however, the rims only need be renewed, and the body portion may be formed of cast-iron, with the rim only of steel. The great friction upon the rim of the rings C C during the rotation of the cylinder tends to move the rim upon its body C′, and this action is liable to cut off the heads of the bolts and thus loosen the rim. To obviate this I form the body portion with slots b for the bolts c, and fasten them by the pins d through the lateral slots c'. The bolts c are thus free to play slightly in the slots b without resisting the tendency of the rim C to move upon the body C′ of the ring under the great friction due to the rotation of the cylinder.

D is the fire-box, which may be moved to or from the cylinder A in the usual manner.

E is a shield located between the fire-box D and the cylinder A to prevent the escape

of the heat between the fire-box and cylinder. This shield E is formed with an opening or passage-way *e* for the heat, into which the neck of the fire-box D may project slightly, as is shown in Fig. 1. The shield E is formed of metal rim F, with an interior of fire-brick G. For cheapness of construction the outer rim F may be constructed of two pieces of angle-iron *f f*, bolted together. The shield E may be raised from the open end of the incinerator A in the usual manner.

H is a guide-supporting piece for properly centering the shield E when it is lowered before the incinerator.

I is a metallic mouthpiece carried by the open end of the cylinder A.

J is the boiler-setting having the combustion-chamber J′ and the flue K leading therefrom to the forward end of the rotary incinerator.

L is a steam-boiler located in the setting J.

M is a liquor-tank to contain the liquor which is to be treated, located above the boiler, so that the products of combustion, after passing from the incinerator or cylinder through the flues of the boiler, may pass out under the tank M. The upper part of the boiler may be protected from the heat by a covering or protecting-wall *k*, which thus forms a flue or passage-way *l* for the products of combustion leading under the tank M.

N is a bell-mouth arranged about the opening of the flue K and projecting into the opening of the cylinder A. For the purpose of making this bell-mouthpiece with a flaring end projecting into the cylinder I prefer to employ the construction shown. (See more particularly Figs. 2 and 3.)

N′ are a series of segmental flaring or bell-shaped sections, which are adapted, when put together, to form a flaring or bell mouth. These segments are provided with lugs *n* upon their exterior surfaces.

O are a series of segmental plates adapted to be bolted together and to the wall adjacent to the flue J. The segments O are also provided with lugs *o*. The segments N′ are bolted to the segments O by means of bolts passing through these lugs *o* and *n*, as is shown in Fig. 2, forming the complete bell-mouthpiece N, the plates O of which are secured to the wall about the opening of the flue K, as has been heretofore described. For the purpose of enabling this flaring or bell mouthpiece to be easily taken apart and removed from the neck of the rotary cylinder the segments are so divided that one or more of them is free to be withdrawn from the adjacent segments when the lugs *o* and *n* are disconnected, as is shown at *g g* in Fig. 2. All of the segments N′ may then be removed.

P is a liquor-supply pipe from the tank M, by which the liquor is fed to a funnel Q, and thence it is introduced into the rotary cylinder A through the mouthpiece N by a pipe R.

The operation of the apparatus is as follows: The liquor in the tank M, being heated therein by the products of combustion passing through the passage-way *l*, is fed through the pipe P into the funnel Q, and passes thence through the pipe R into the rotary cylinder A, where it is incinerated. The ash is drawn out of the cylinder A through the opening adjacent to the fire-box when the shield E is raised. The products of combustion pass through the cylinder A, and thence out through the flue K into the combustion-chamber J′, whence they pass through the flues of the boiler and out through the passage-way *l*. The same products of combustion are thus utilized for incineration in the cylinder A for generating steam in the boiler L and for heating the liquor in the tank M. The shield F and bell-mouthpiece N serve to effectually exclude the air from passing into the incinerator between it and the fire-box, and from passing into the flue K otherwise than from the incinerator. By this means a much greater heat is obtained for generating steam in the boiler L and for heating the liquor in the tank M.

While I prefer the minor details of construction which have been shown, I do not limit myself to them, as it is apparent that they may be varied without departing from the invention.

What I claim as new, and desire to secure by Letters Patent, is—

1. A rotary incinerator having one or more driving-rings about its outer surface, provided with a separate rim fastened thereto with slight freedom of circular movement upon the body of said ring.

2. A rotary incinerator having a metal driving-ring C, consisting of the body portion C′, fastened to the outer surface of the incinerator and provided with slots *b* in its upper surface and the lateral slots *c′* in its sides, the rim C^2, the bolts *c*, passing through the rim C^2 into the slots *b*, and the pins *d*, passing through the lateral slots *c′* into the bolts *c*.

3. In apparatus for reclaiming soda-ash, the combination, with a rotary incinerating-furnace, of a stationary outwardly-flaring mouthpiece projecting into the rotary incinerator and having its diameter within the incinerator larger than the diameter of the opening thereof through which it projects.

4. The combination, with a rotary incinerator, of a stationary flue adjacent to the neck thereof and an outwardly-flaring bell-mouthpiece about said stationary flue, projecting into said incinerator and formed in segments.

5. The combination of a rotary incinerator, of a bell-shaped mouthpiece N, consisting of the segmental outwardly-flaring pieces N′ and the segmental plate O, to which said segmental pieces N′ are detachably connected.

6. In an apparatus for reclaiming soda-ash, the combination of the fire-box D, rotary cylinder A, having the mouthpiece I projecting beyond the end of the cylinder, and the shield E, having a central opening *e*, arranged between the fire-box and mouthpiece I.

7. In an apparatus for reclaiming soda-ash, the combination of a stationary part having an outlet-flue, a rotary incinerator, a mouthpiece carried by said stationary part about the flue and projecting into the rotary incinerator, an outwardly-projecting mouthpiece carried by the opposite end of the rotary incinerator, a fire-box, and a shield having a central opening and arranged between the fire-box incinerator.

In testimony of which invention I have hereunto set my hand.

LEWIS D. ARMSTRONG.

Witnesses:
R. F. HUDSON,
H. A. DARNETT.