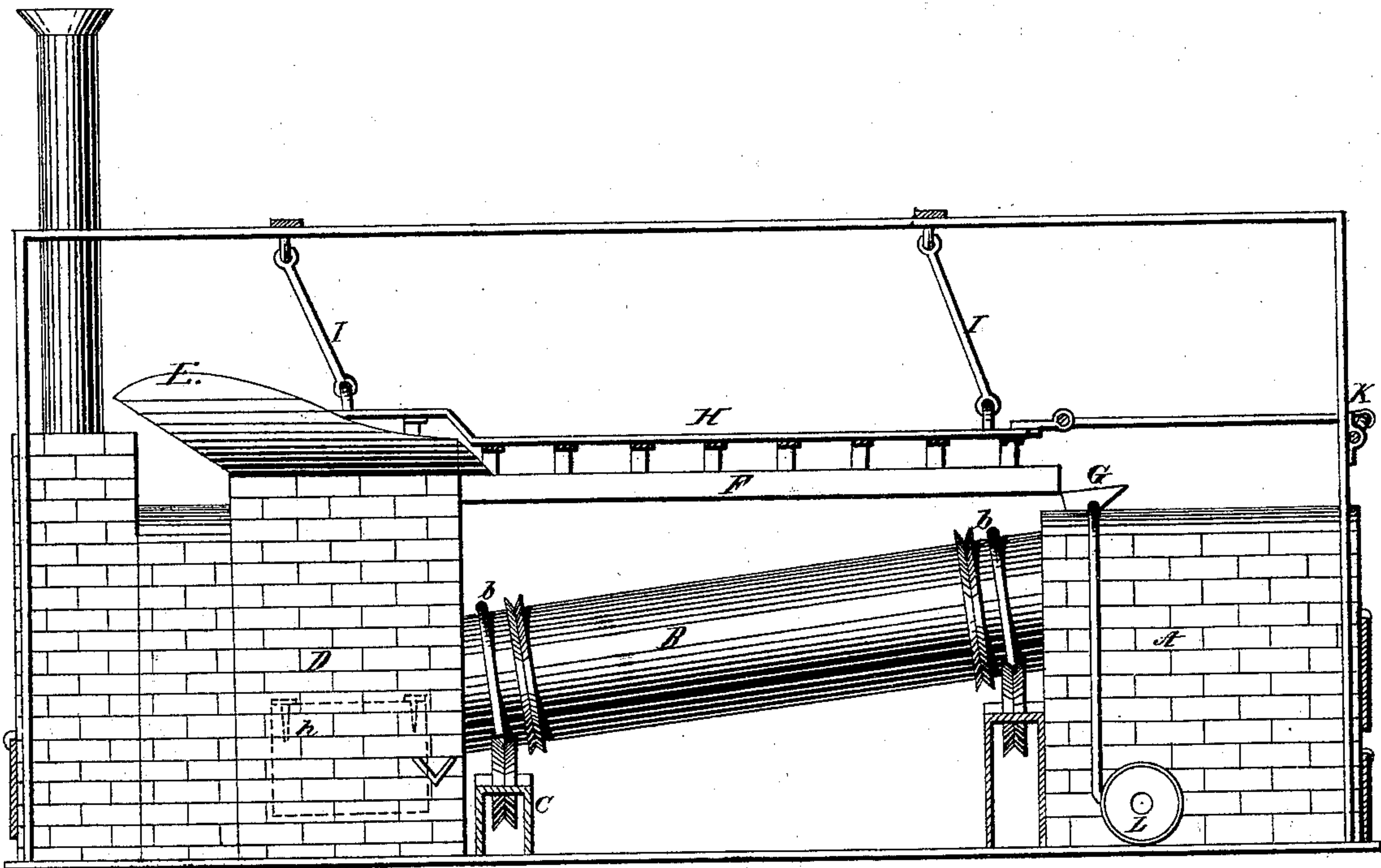


JOHN H. DUNSTAN.

Improvement in Furnaces for Calcining Ores.

No. 125,384.

Patented April 9, 1872.



Witnesses
Saml Wallbridge
Tom B. Dean

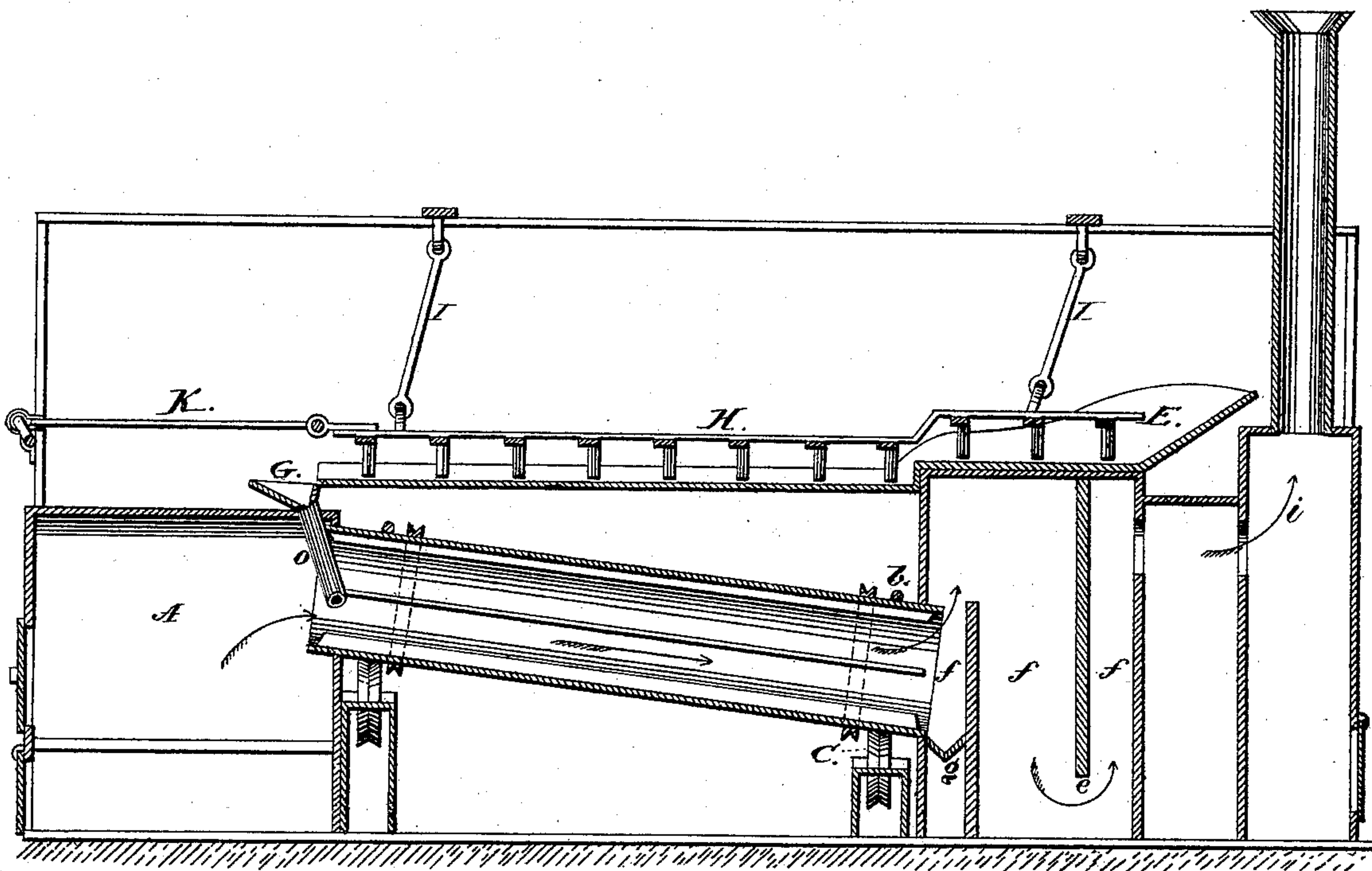
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Fig. 1.

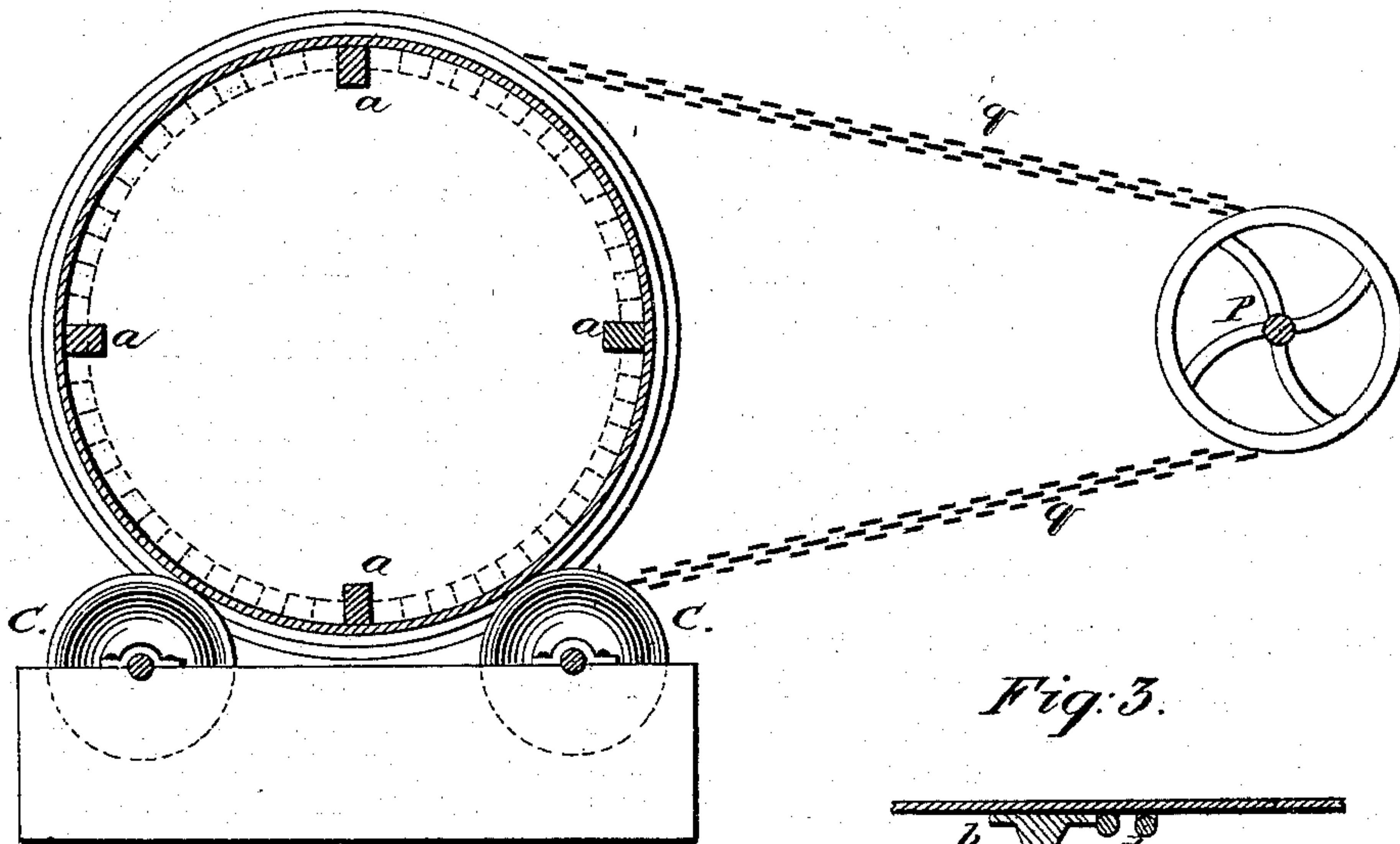


Fig. 3.



Fig. 2.

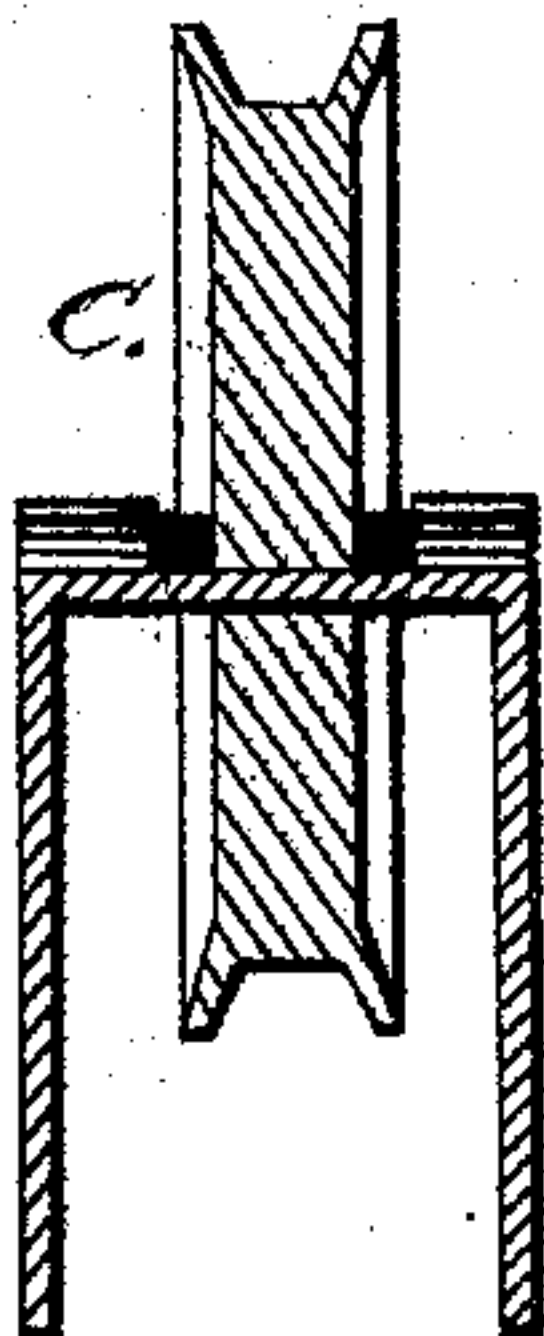


Fig. 4.

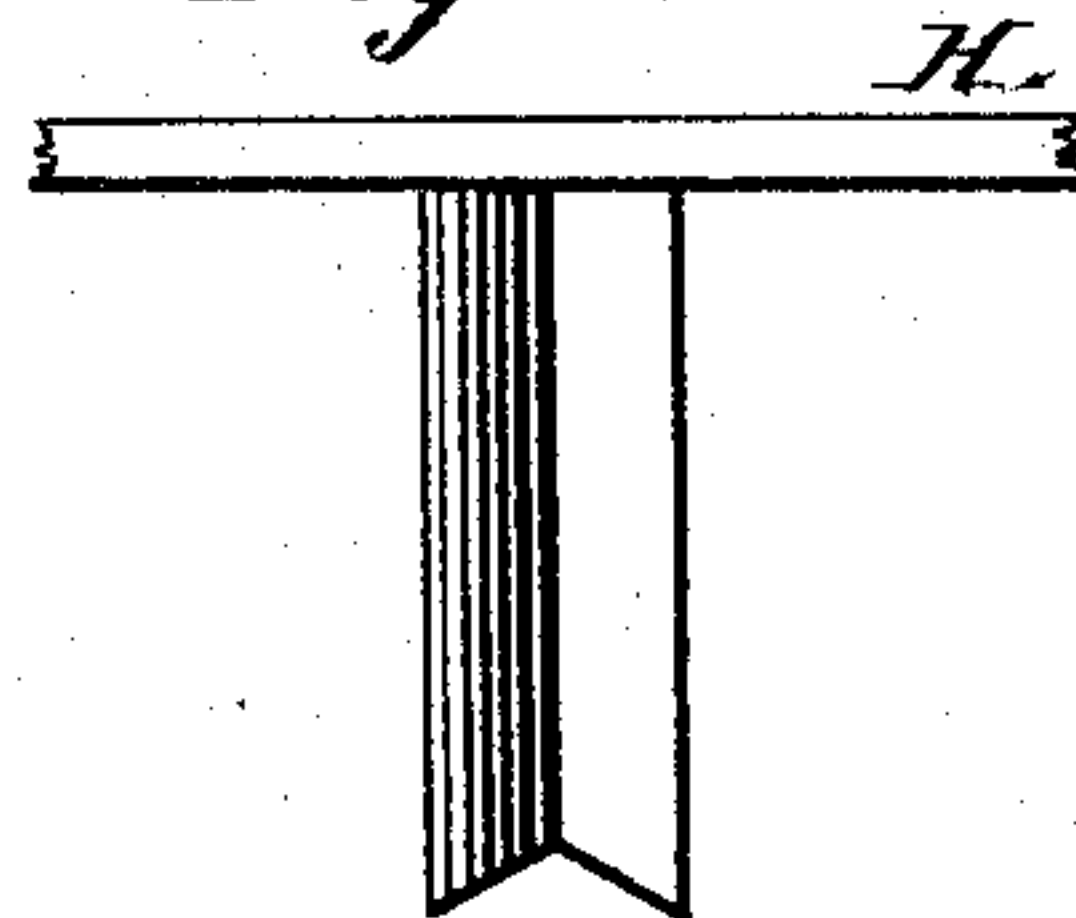
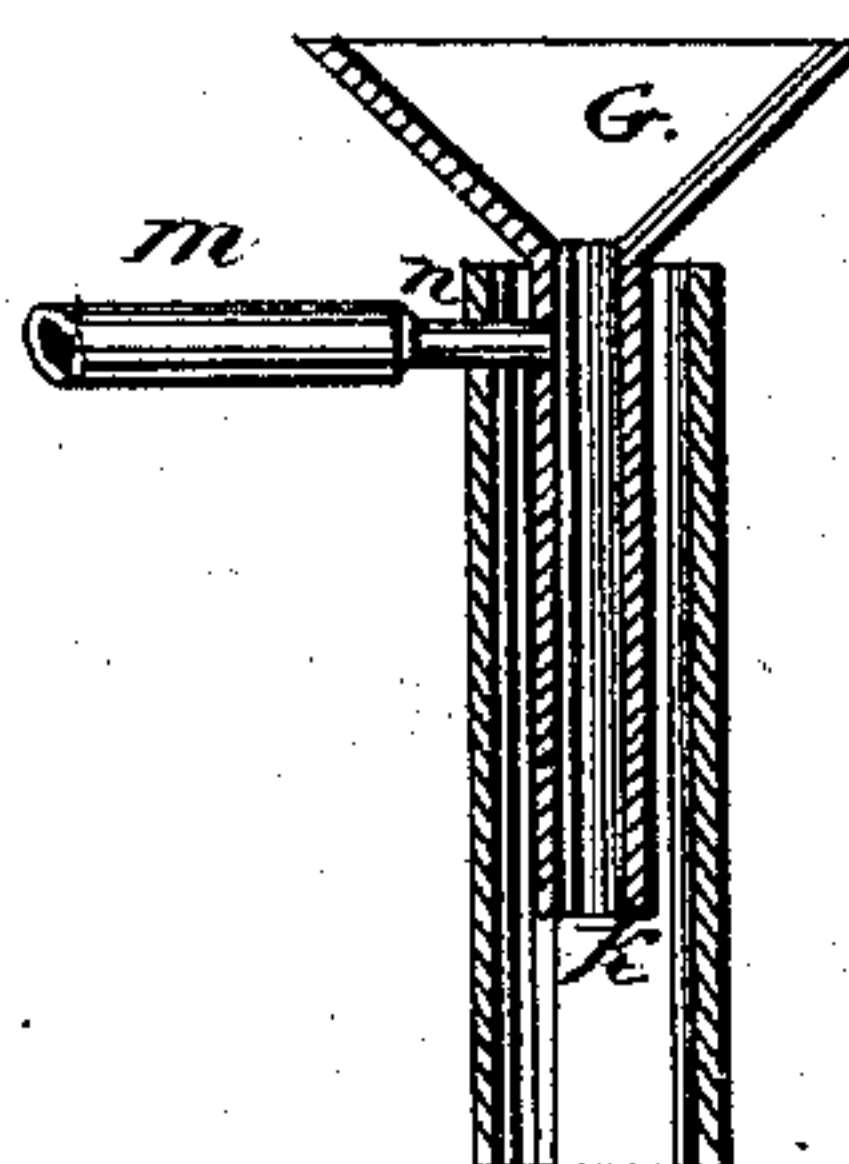


Fig. 5.



Witnesses

Saml Wallbridge
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UNITED STATES PATENT OFFICE.

JOHN HARRIS DUNSTAN, OF BELLEVILLE, CANADA.

IMPROVEMENT IN FURNACES FOR CALCINING ORES.

Specification forming part of Letters Patent No. 125,384, dated April 9, 1872.

I, JOHN HARRIS DUNSTAN, of the town of Belleville, in the county of Hastings, Province of Ontario and Dominion of Canada, mining engineer, have invented a Furnace for Calcining Mineral Ores, of which the following is a specification:

Nature and Object of the Invention.

My invention is intended to desulphurize, calcine, and granulate mineral ores containing sulphur and arsenic, or either of them.

Description of the Accompanying Drawing.

Plate 1 is a drawing of the machine. Plate 2 is a longitudinal section of the same. Plate 3 shows sections of different parts, as follows: Figure 1 shows cross-section of cylinder, showing fire-brick lining, shelves, friction-rollers, clip-pulley, and chain. Fig. 2 shows section of friction-roller. Fig. 3 shows section of bands around the cylinder. Fig. 4 shows a tooth of the rake. Fig. 5 shows longitudinal section of hopper, feed-pipe, and air-pipe, showing where the air enters.

General Description.

A is a fire-place of brick, at the back end of which enters the end of the cylinder B, made of thin boiler-iron, and lined with fire-brick or tiles, and having shelves *a a a a a*, Fig. 1, Plate 3, of the same material, built into the lining. The cylinder rests on three or more pairs of friction-rollers, C, with V-shaped face. Surrounding and attached to the cylinder are three or more cast-iron bands, *b b b*, Plate 1. Fig. 3, Plate 3, shows a section of the bands. *c* is a raised V-shaped rim corresponding with and running in friction-roller. *d* is the clip-pulley. The cylinder inclines slightly from the fire-box to the far end, which enters a brick chamber, D. This chamber is divided by brick walls *e e*, Plate 2, (built at right angles to the cylinder,) into three or more compartments, *f f f*. The first chamber contains an iron V-shaped trough, *g*. One side is placed under the end of the cylinder. This trough is inclined and runs across D, Plate 1. The second is a dust-chamber with an iron-door, *h*, for cleaning, &c. The third is a condensing-chamber, from which runs the flue *i*, Plate 2. The flue may contain other condensing-cham-

bers. On the top of these chambers is an iron drying-pan, E, Plate 1. On the front end and joining to the drying-pan is an iron trough, F, passing above the cylinder to a hopper, G, over the fire-box. In this pan and trough is a rake, H, with iron teeth, Fig. 4, Plate 3, each row of which are intermediate. They are formed in the shape of two sides of a triangle the vertex of which faces the back part of the pan. The base faces the hopper. This rake is suspended by iron rods I I, Plates 1 and 2, and is worked forward and backward by a rod and eccentric, K. The hopper G is of iron. At the lower part are two pipes, Fig. 5, Plate 3, one within the other. The inner one, *k*, opens into the hopper, and is shorter than the outer one, (as shown in the drawing.) The outer one connects with the nozzle of a pipe, *m*, leading from a fan, L, Plate 1. A small nozzle, *n*, Fig. 5, Plate 3, leads from the pipe *m* into the inner pipe *k*. The lower ends of these pipes enter the upper end of the cylinder at *o*, Plate 2. On a line of shafting, P, Fig. 1, Plate 3, running parallel with the cylinder, are three or more clip-pulleys, set opposite to the clip-pulleys on the cylinder. Chains *q* are passed around both sets of pulleys, so that when the shafting is turned the cylinder revolves. The line of fire and draught is shown by the arrows in Plate 2.

The mode of working is as follows: The fire is lighted, the flame of which passes through the cylinder. The machinery is set in motion, which causes the cylinder to revolve, the rake to move forward and back, and the fan to furnish oxygen. The pulverized ore is thrown upon the iron pan to dry; the rake plows through it on its back stroke, owing to the vertex edge of the teeth facing that way, and on the forward stroke the base of the teeth draws the ore forward toward the hopper, on reaching which it falls into and runs through the inner pipe into the fan-blast of the outer pipe, and is then carried by the blast into the flame inside the cylinder, the blast thus scattering the pulverized ore and furnishing oxygen for combustion. After dropping through the flame it falls on the bottom of the cylinder, and as the cylinder revolves it is carried up by the shelves and falls through the flame time and again until it reaches the end of

the cylinder, to which the incline and the draught passing through tend to carry it. On dropping from the cylinder the calcined ore falls into a running stream of water in trough *g*, and is thus granulated.

Claims.

1. The combination of the fan *L* and pipe *m* with hopper *G* and cylinder *B*, as and for the purpose specified.

2. In combination with cylinder *B*, trough *g*, supplied with running water, as and for the purpose set forth.

3. The combination of drying-pan *E*, trough *F*, reciprocating-rake *H*, hopper *G*, and cylinder *B*, as and for the purpose set forth.

JOHN H. DUNSTAN.

Witnesses:

SAMUEL SHELLEY WALBRIDGE, Jr.,
THOMAS BULL DEAN.