

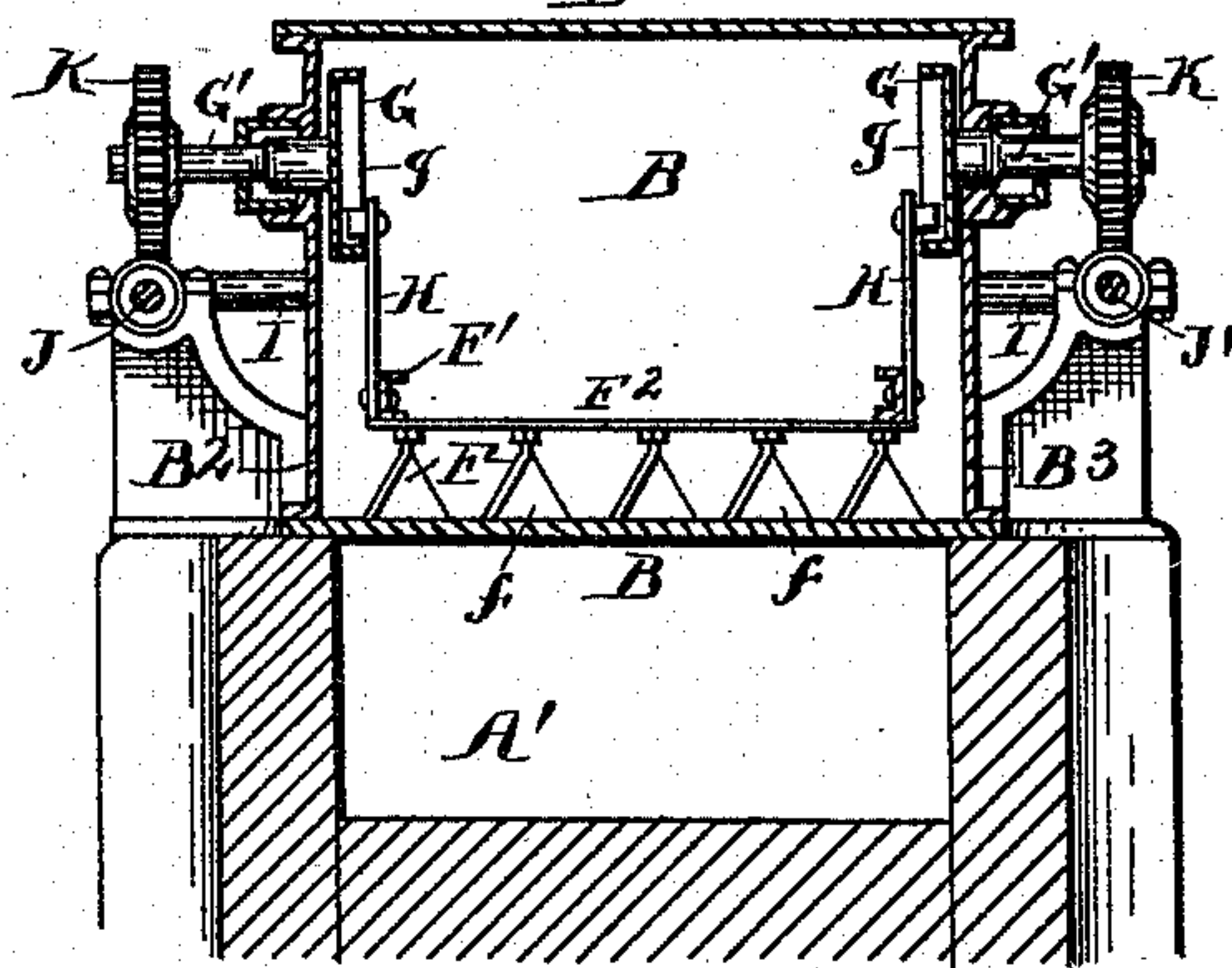
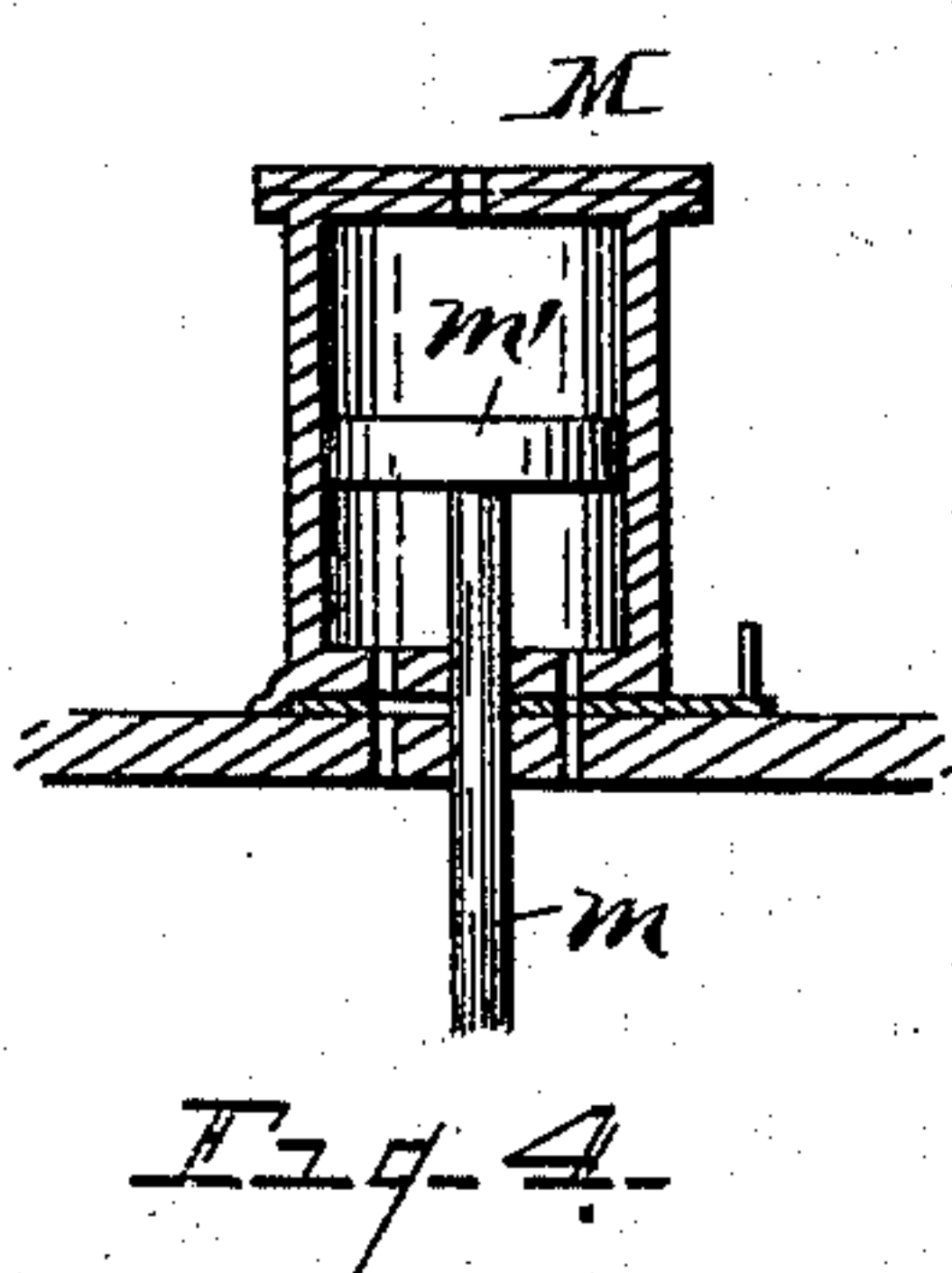
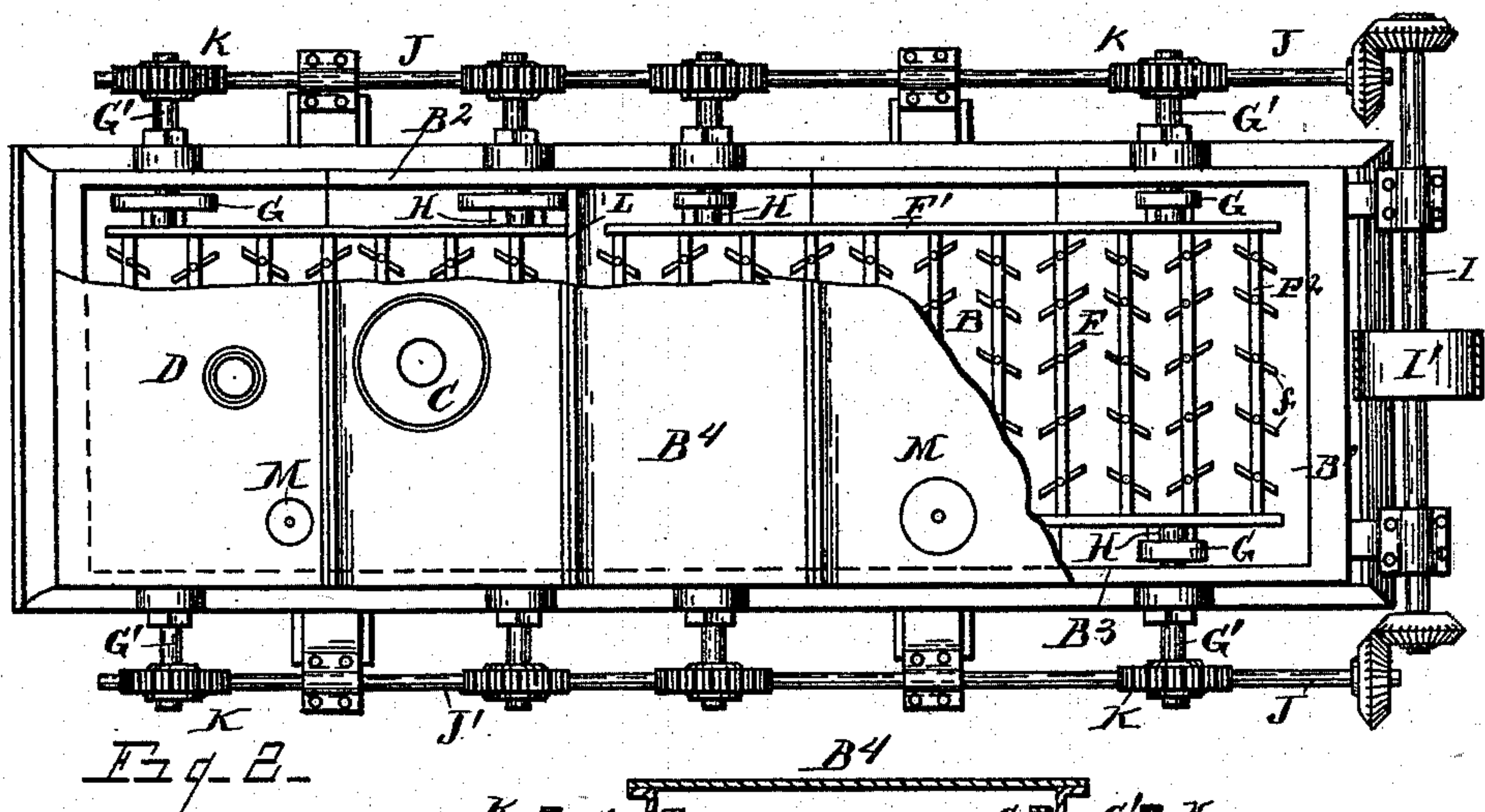
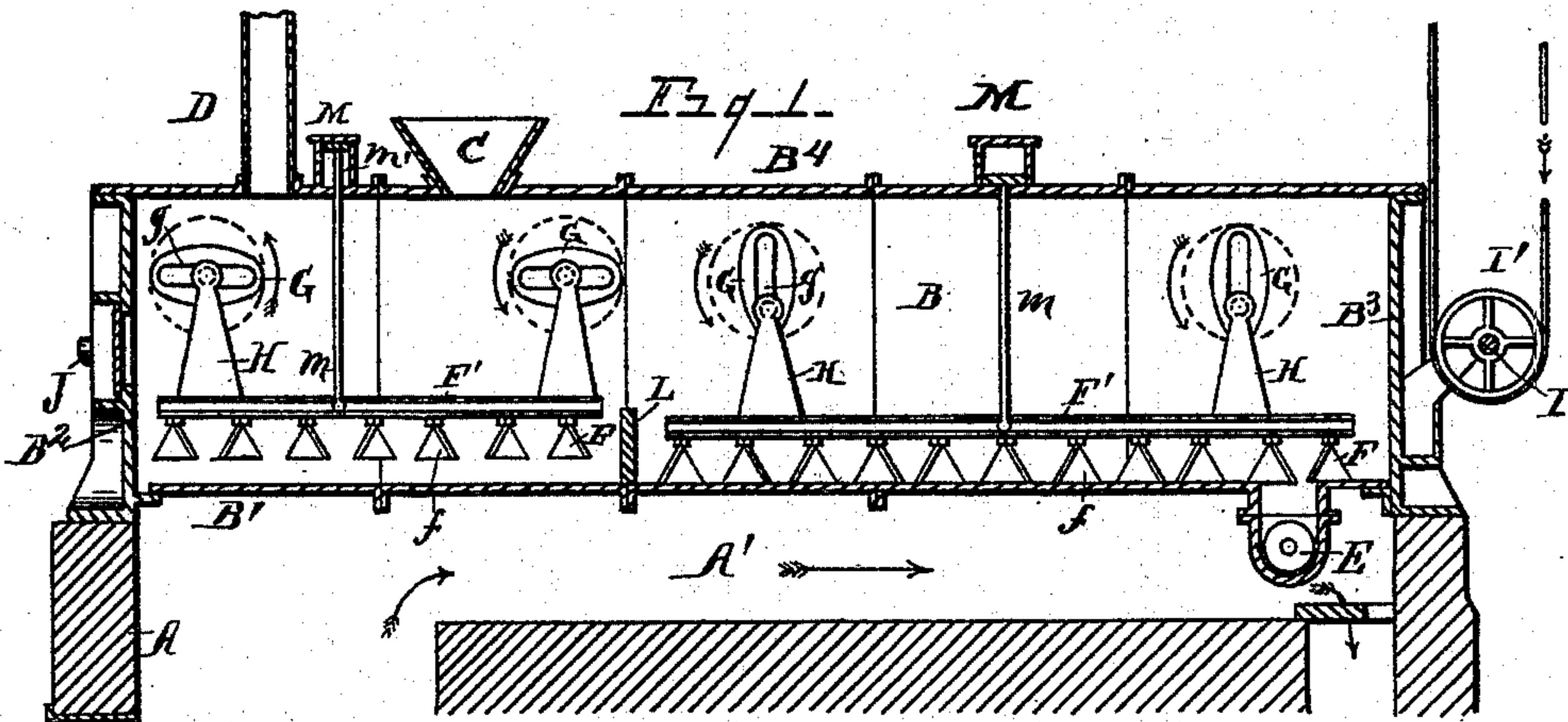
(No Model.)

J. R. & H. WATSON.

APPARATUS FOR DRYING, ROASTING, AND CALCINING SODA ASH.

No. 527,912.

Patented Oct. 23, 1894.



WITNESSES
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Fig. 3- INVENTORS
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By *their* Attorney

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UNITED STATES PATENT OFFICE.

JOHN R. WATSON AND HERBERT WATSON, OF WYANDOTTE, MICHIGAN.

APPARATUS FOR DRYING, ROASTING, AND CALCINING SODA-ASH.

SPECIFICATION forming part of Letters Patent No. 527,912, dated October 23, 1894.

Application filed December 4, 1893. Serial No. 492,690. (No model.)

To all whom it may concern:

Be it known that we, JOHN R. WATSON and HERBERT WATSON, subjects of the Queen of Great Britain, residing at Wyandotte, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Apparatus for Drying, Roasting, and Calcining Soda-Ash; and we declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

Our invention relates to certain new and useful improvement in an apparatus for drying, roasting and calcining soda ash, more particularly, but also applicable for use with other materials such as ores, grain, &c.

To these ends our invention consists of the construction, combination and arrangement of devices and appliances hereinafter specified and claimed and illustrated in the accompanying drawings, in which—

Figure 1 is a vertical longitudinal section of the apparatus. Fig. 2 is a plan view showing portions of the cover broken away, and Fig. 3 is a vertical cross section. Fig. 4 is an enlarged view of the cylinder M.

We will explain our invention as applied to convert bicarbonate of soda to carbonate of soda, under the influence of heat.

Accordingly A represents any suitable furnace. The combustion chamber of the furnace may be located therein at the back or discharge end of the apparatus, or as shown the combustion chamber may be located under the front or feed end of the apparatus. The flues A' run underneath the drying chamber preferably the full length of the machine.

B is a drying chamber of any suitable construction as with bottom plates B', side walls B², B³ and a cover B⁴. The bottom plates have any suitable engagement with the sides of the apparatus. Any suitable cover may be provided to prevent the escape of gas or dust.

C is the feeding duct or conduit through which the bicarbonate of soda enters into the drying chamber, said bicarbonate of soda

dropping upon the bottom plates of the drying chamber.

D is an exit orifice in the top of the drying chamber. E is a conveyer located toward the lower end of said chamber arranged to discharge the material.

Within the chamber we provide agitating mechanism to agitate the material to be calcined or dried. We accomplish this agitation by means of scrapers F. As shown these scrapers consist of the frame F', which may be made of angle iron as shown more particularly in Fig. 3, to which are engaged cross bars F² provided with scraper blades "f," suitably engaged therewith.

The drying chamber may be provided with any suitable number of scrapers, two frames being shown in the drawings provided with the scraper blades. These scrapers are made reciprocatory in any suitable manner and by any suitable means, as for example by slotted cranks G each provided with an elongated slot "g" in which is engaged a connecting rod H engaged with the corresponding frame of the scraper. To operate the slotted cranks we have shown a driving shaft I provided with a driving pulley I', said shaft geared with longitudinal shafts J, J' at the sides of the drying chamber, as shown. The arms G' of the slotted cranks are provided with a worm gear K meshing with the corresponding gear on the shafts J, J'. It will be perceived thus, that a reciprocatory movement will be given to the scrapers to carry or work the substance being treated rearward toward the conveyer.

L denotes a transverse, upright plate extending across the drying chamber and up a desired height to allow a certain portion of the substance being treated to overflow said plate at each stroke of the scraper in the feed end of the chamber. The plate L serves to hold a thicker layer of moist material directly over the furnace and to prevent dust by keeping the body of the material being treated over the scraper blades. After passing over the transverse plate the material treated is traversed in a thinner layer to the opposite end of the machine where it drops into the conveyer previously mentioned which is arranged not only to deposit the ma-

terial, but also at the same time to form a
lute to prevent the gas escaping. Any suit-
able number of exit orifices may be provided
in the cover or sides of the drying chamber
5 to take off the gas and dust.

It will be perceived that the bars or arms
F² to which the scraper blades are attached
may have a rearward movement and are then
lifted by the slotted cranks and returned for
10 a successive forward movement. The slot-
ted cranks can be made of any suitable shape
and give either a greater or less traverse to
the scraper blades. In order to regulate the
fall of the scrapers they are connected to a
15 dash pot or cylinder M, as by a rod "m" pro-
vided with a piston m'. The cylinder is pro-
vided with an air exit which may be provided
with any suitable means for regulating the
exit of air therethrough or instead thereof
20 suitable springs may be employed, to prevent
the scrapers from dropping when lifted, to
the bottom of the chamber. It will be per-
ceived that by making the worm gears, above
referred to, equal, the slotted cranks will
25 work simultaneously the one with the other.
In order to equalize the operation of the worm
gears we prefer to divide the number of slot-
ted cranks so that four of a set work together,
the same being spaced so that when one of
30 said arms is entering the material the other
may be leaving it and a third set may be fully
in the material.

It is evident that the particular construc-
tion hereinbefore described, not only reciprocates the scraper blades, but elevates and 35
lowers said blades alternately upon the back-
ward and forward movements of the blades.

What we claim as our invention is—

1. In combination, a drying chamber, an
agitator consisting of a frame provided with 40
cross bars F² each carrying depending scraper
blades, and rotatable slotted cranks con-
nected with said frame whereby the frame is
reciprocated and given a rising and falling
motion as the cranks are rotated, substan- 45
tially as set forth.

2. In combination, the drying chamber pro-
vided with a transverse plate intermediate
the ends of the chamber and reciprocatory
agitators located on each side of the trans- 50
verse plate, substantially as set forth.

3. In combination, a drying chamber, a re-
ciprocatory agitator slotted cranks to recip-
rocate the agitator, and to elevate and lower
it alternately on its forward and backward 55
movements and rotatable shafts geared with
said slotted cranks, substantially as set forth.

In testimony whereof we sign this specifica-
tion in the presence of two witnesses.

JOHN R. WATSON.
HERBERT WATSON.

Witnesses.

N. S. WRIGHT,
H. R. WHEELER.