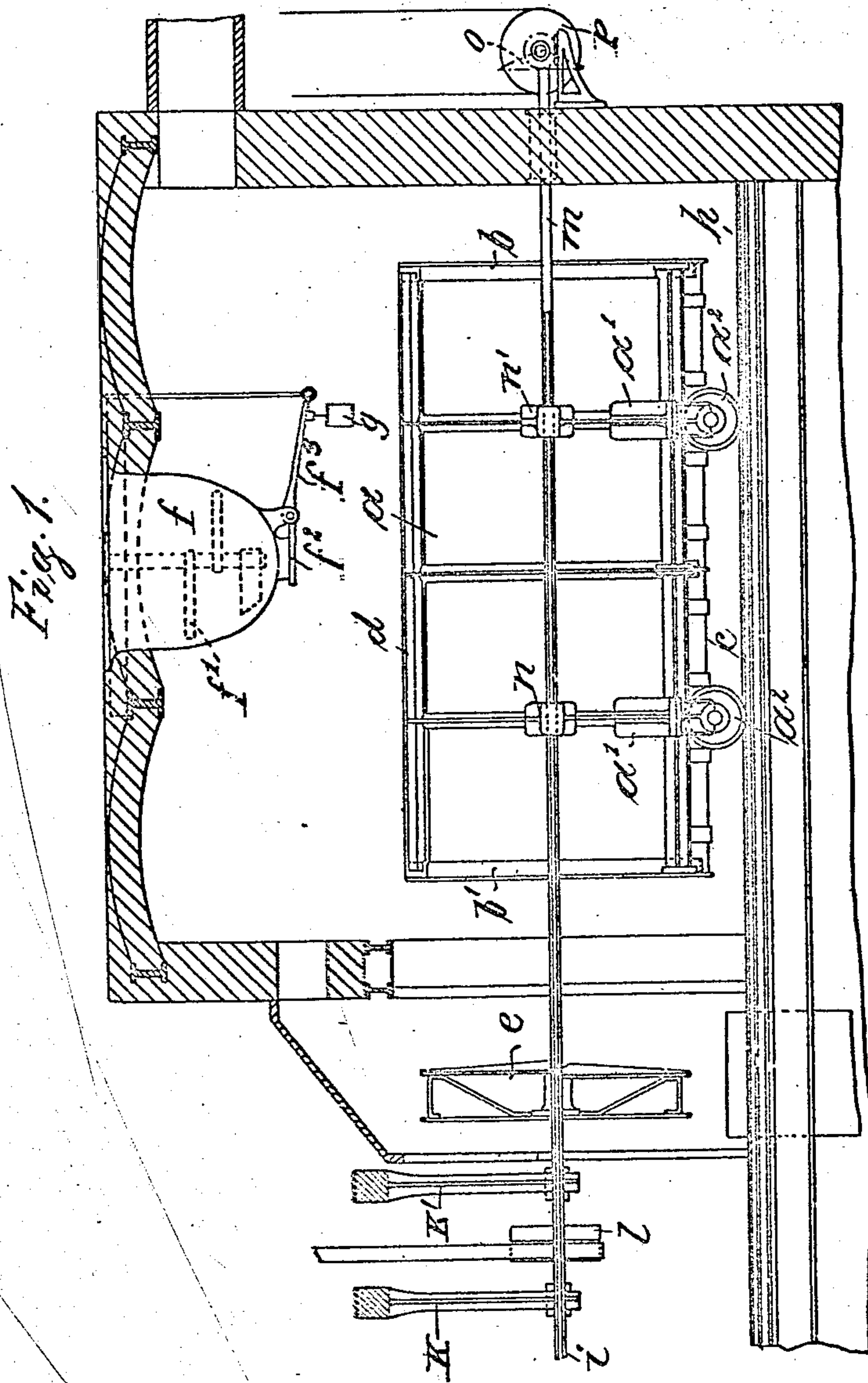


F. GRIESEL.  
 APPARATUS FOR CUTTING UP SUPERPHOSPHATE MASSES.  
 APPLICATION FILED APR. 28, 1907.

899,042.

Patented Sept. 22, 1908.

3 SHEETS—SHEET 1.



Witnesses:  
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 Emil Hayser.

Inventor:  
 Fritz Griesel  
 by *Charles Seip*  
 Attorney

F. GRIESEL.

APPARATUS FOR CUTTING UP SUPERPHOSPHATE MASSES.

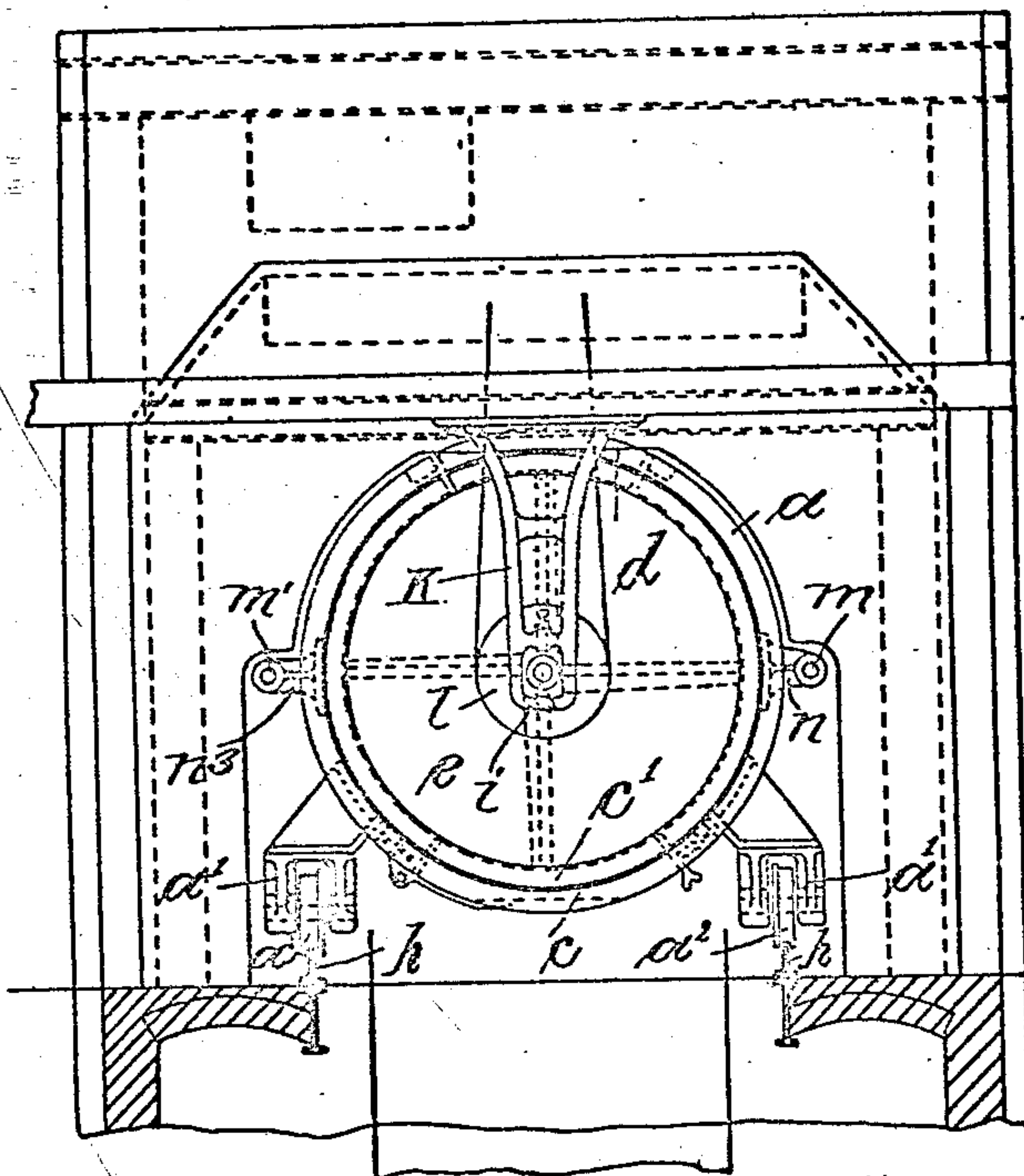
APPLICATION FILED APR. 26, 1907.

899,042.

Patented Sept. 22, 1908.

3 SHEETS—SHEET 2.

*Fig. 2.*



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Attorney



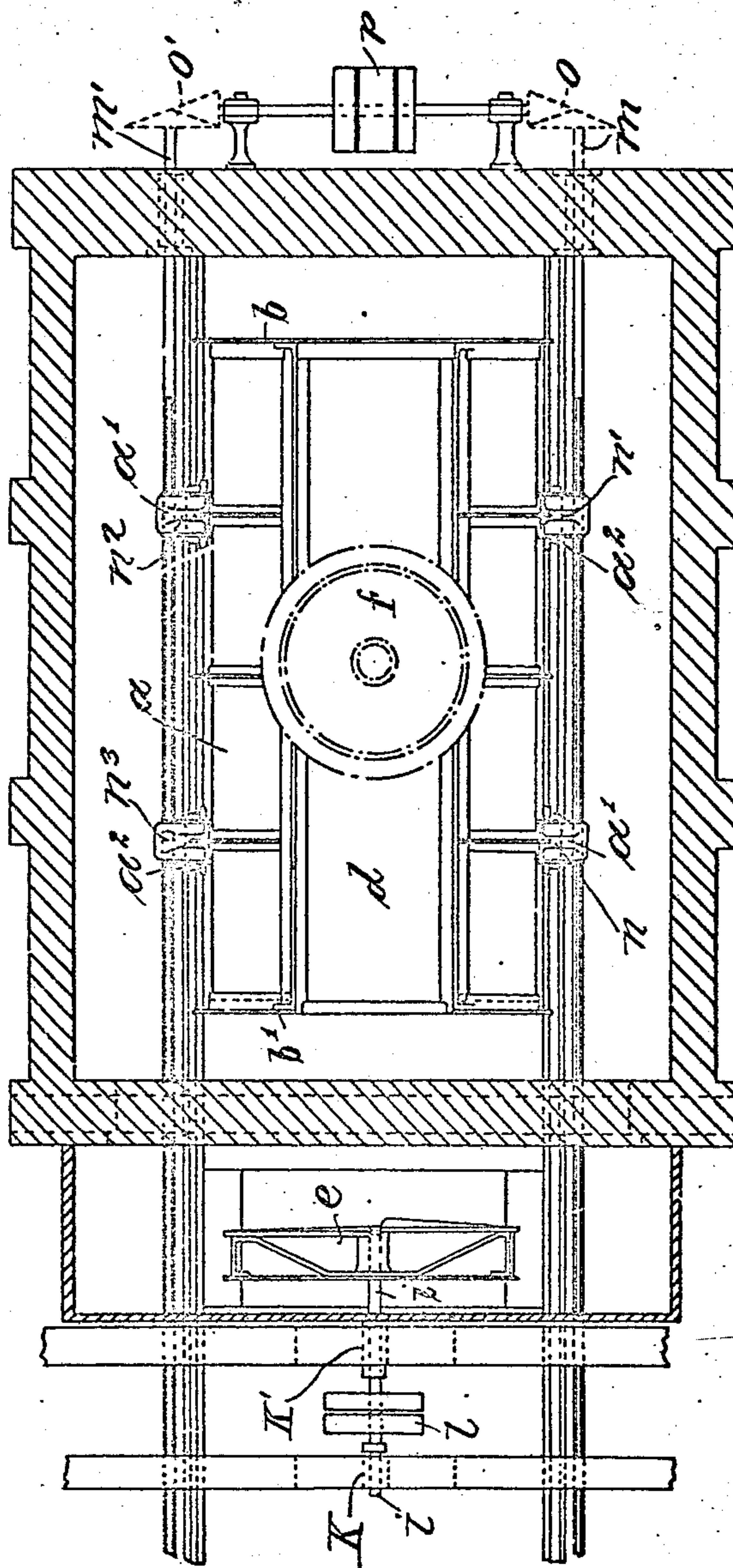
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3 SHEETS—SHEET 3.

Fig. 3.



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# UNITED STATES PATENT OFFICE.

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FABRIK ACTIEN-GESELLSCHAFT VORMALS MORITZ MILCH & CO., ZWEIGNIEDERLAS-  
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## APPARATUS FOR CUTTING UP SUPERPHOSPHATE MASSES.

No. 899,042.

Specification of Letters Patent.

Patented Sept. 22, 1908.

Application filed April 26, 1907. Serial No. 370,465.

*To all whom it may concern:*

Be it known that I, FRITZ GRIESEL, a sub-  
ject of the King of Prussia, and resident of  
Schellmühl, near Danzig, in the German Em-  
pire, superintendent, have invented an Im-  
proved Apparatus for Cutting Up Super-  
phosphate Masses, of which the following is  
an exact specification.

My invention deals with an apparatus by  
means of which superphosphate masses kept  
in large reservoirs and tanks are cut up me-  
chanically.

As is well known superphosphate is a  
product of a mixture of phosphate with an  
acid, which two components are first me-  
chanically mixed in a special receptacle pro-  
vided with means for a thorough stirring of  
the mass, which mixture is then allowed to  
flow into a large reservoir or special rooms  
where the mass remains in a state of rest for  
a certain period of time during which time  
the reaction between the different compo-  
nents takes place and the mass slowly be-  
comes solid. The breaking up of such solidi-  
fied superphosphate masses has up to date  
been accomplished by hand, and in spite of  
all preventive measures employed these op-  
erations have proved to be a source of troubles  
and maladies for the laborers doing the work,  
inasmuch as it is impossible to prevent an  
inhaling of the dangerous gases which de-  
velop during the very act of cutting up the  
mass, that is just at a time when the laborer  
is compelled to be in the immediate neigh-  
borhood of the gas-source. Another danger  
has developed from the habit of the work-  
men to undercut the superphosphate mass in  
order to hurry on the work—though this pro-  
ceeding is strictly against the rules—which  
bad practice easily results in burying of the  
laborer underneath the falling top-masses  
of the superphosphates. Naturally manual  
labor of such kind can only be accomplished  
by establishing repeated periods of rest at  
certain intervals for the laborer employed  
and consequently the number of men wanted  
will be rather large in comparison with the  
amount of work done. Thus the labor ac-  
complished in this way is rather expensive.

Now I am aware of the fact that trials  
have been made to substitute mechanical

power for the older method of employing  
hand labor. To this purpose an apparatus  
consisting of knives radially attached to a  
rotating shaft was placed within the station-  
ary tank holding the solidified superphos-  
phate mass, which device was slowly ad-  
vanced in an axial direction within the tank.  
But arrangements of this type have shown  
serious drawbacks in applied practice, inas-  
much as the whole device and the shaft upon  
which it was mounted had to be embedded  
into the mass and even if provisions were  
taken to keep those parts at least partially  
out of the mass, such dispositions could not  
be made tight enough to prevent penetrating  
of the mass. In a short time all the iron  
parts became more or less corroded and  
starting of such an embedded apparatus was  
always accompanied by a series of troubles,  
not to speak of the constant repair and care  
required.

The principal object of the present inven-  
tion is to avoid these troubles experienced  
by employing an independent cutting device  
which is mounted separate and outside of  
the reservoir holding the superphosphate  
mass and whose center line of shaft forms one  
straight line with the extended center line of  
the cylindrical tank chosen as reservoir. This  
cutting device, the peculiar construc-  
tion of which will be fully described further  
on, principally consists of a number of prop-  
erly dimensioned and arranged knives mount-  
ed on a rotating shaft, which knives cut  
themselves into one of the bottom sides of  
the solidified mass by either moving the ro-  
tating knives in an axial direction towards  
said mass or vice versa by advancing the  
tank towards the stationary cutting device.

In order to make my invention better  
understood I accompany same by drawings,  
showing by way of example a constructional  
form of the apparatus in which

Figure 1 represents a side view, Fig. 2 an  
end view and Fig. 3 a top view of the whole  
apparatus.

A description of the details and the method  
of working of the illustrated apparatus is  
given in the following:

The mixing of the different components  
which afterwards constitute the superphos-



phate mass is done in a receptacle  $f$  of sufficient size and convenient form, provided with a stirring device  $f'$ . The bottom of the receptacle has a discharging opening which during the mixing and stirring manipulation is closed by a cover  $f^2$ . A weight  $g$  attached to the lever  $f^3$  keeps said cover closed. As soon as the mass is considered thoroughly mixed, the cover  $f^2$  is opened and the liquid mass will flow into the tank  $a$  positioned below said receptacle  $f$ . This tank  $a$ , which for practical reasons is formed cylindrical, is for this purpose provided with an oblong top-opening  $d$  through which the mass flows in and has on its bottom a suitably dimensioned slot  $c'$  extending the whole length of the tank. Said slot is provided with a suitable cover  $c$  which is closed during the filling process and removed during the cutting manipulation. The two sides of the tank are also closed by detachable covers  $b$  and  $b'$  to be removed as the mass is to be cut up. To the bottom of the tank a truck arrangement is fastened consisting of four supports  $a'$  each one carrying a truck wheel  $a^2$ . These wheels run on parallel rails  $h$ . The whole arrangement serves the purpose of making the tank transportable and capable of gradually advancing in the direction towards the cutting device  $e$ . The latter is mounted on a short shaft  $i$ , the extended center line of which coincides with the center line of the tank  $a$ , the shaft  $i$  is journaled at the suspended bearings  $k$  and  $k'$  and actuated by the pulley  $l$ . In the construction selected the whole cutting device is arranged stationary and the tank containing the superphosphate mass transportably disposed. In the present case this transportability is achieved by providing threaded shafts  $m$  and  $m'$  one on each side of the tank  $a$ , the thread of each shaft meshing into threaded nuts, which are in a suitable manner borne by arms  $n$ ,  $n'$ ,  $n^2$  and  $n^3$ , firmly attached to the sides of the tank  $a$ . The threaded shafts  $m$  and  $m'$  are rotated by means of two sets of conical gearings  $o$  and  $o'$  which in turn are actuated by the pulley wheels  $p$ . By means of the selected arrangement the tank  $a$  with its contents is gradually advanced towards the cutting device  $e$ , which is previously set in motion and the cutting edges of the knives of the latter cut the gradually advancing mass of superphosphate slowly and under hardly any application of pressure into small pieces. The latter fall through the bottom slot  $c'$  of the tank into suitable receptacles disposed below the slot whence the cut-up matter may be transported to other cutting or breaking up devices well known in the art, provided such a further dividing in still smaller fractions is desirable. It must be understood that the cutting manipulation

of the device must be accomplished by applying a very small force of pressure, because the application of pressure beyond a certain point causes the substance cut to become greasy, a state which must be avoided.

The mechanical means for bringing the two separating parts viz the rotating knives of the cutting device and the superphosphate block in the transportable tank together, may be arranged in different ways without departing from the principle of my invention.

I can make the knife stationary and move the block as shown in the illustrations, or I may have the block stationarily disposed and the cutting device advancing towards it or I may move both parts simultaneously before and during the process of cutting the mass. Furthermore I am able to use two or more cutting devices to cut up the block either from the one end or from both ends at the same time, according to practical conditions arising.

In providing for a transportable tank by placing same on a movable truck running on rails a great advantage of practical importance is achieved. In the first place the tanks after having been used can be readily transported to any suitable place for either repair or ventilation; secondly several tanks can be filled from one mixing receptacle one after another and the contents of the filled tanks can be afterwards cut up by a single cutting device. For this purpose the rails  $h$  must be extended to a suitable place outside of the apparatus illustrated.

I claim:—

1. An improved apparatus for cutting up superphosphate masses comprising in combination a tank holding the mass, a horizontally disposed shaft journaled in supports outside and independent of said tank, a cutting device fixedly mounted upon said shaft and means for gradually advancing the cutting device and the tank towards each other.
2. An improved apparatus for cutting up superphosphate masses comprising in combination a tank holding the mass, a horizontally disposed shaft journaled in supports outside and independent of said tank, the extended center line of which shaft coincides with the center line of the tank, a cutting device fixedly mounted upon said shaft and means for gradually advancing the cutting device and the tank towards each other.
3. An improved apparatus for cutting up superphosphate masses comprising in combination a cylindrical tank holding the mass, said tank having a suitable top opening and a slot extending the whole length of the bottom, a removably attached cover for said tank, side covers also removably attached, a horizontally disposed shaft, journaled in



supports outside and independent of said tank, the extended center line of which shaft coincides with the center line of the tank, a stationary cutting device fixedly mounted  
5 upon said shaft and means for gradually advancing the transportable tank towards the stationary cutting device.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

FRITZ GRIESEL.

Witnesses:

FRANK S. N. DUNSBY,  
ERNST STRUMSKI.