

(No Model.)

P. W. GATES.

INCLINED DIAPHRAGM OF GYRATORY STONE BREAKERS.  
No. 525,405. Patented Sept. 4, 1894.

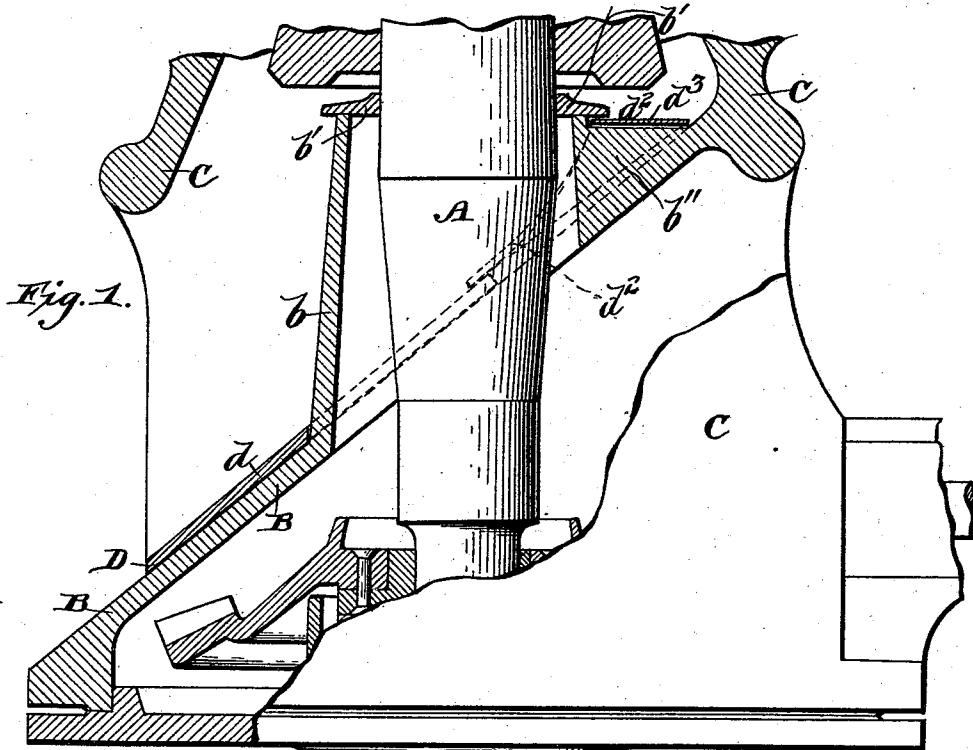


Fig. 2.

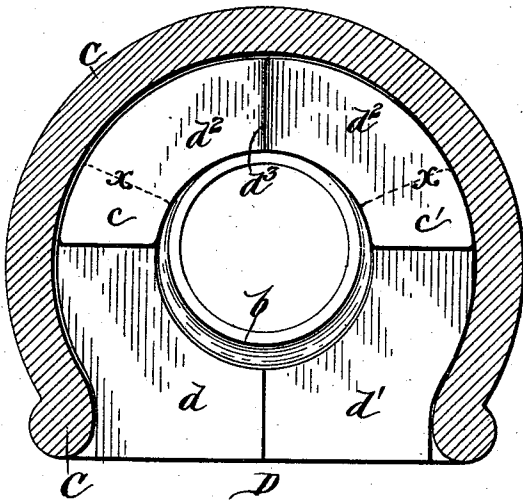
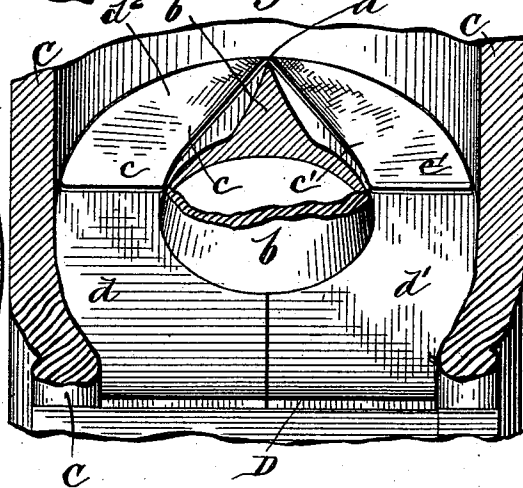


Fig. 3.



Witnesses

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Inventor

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# UNITED STATES PATENT OFFICE.

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IRON WORKS, OF SAME PLACE.

## INCLINED DIAPHRAGM OF GYRATORY STONE-BREAKERS.

SPECIFICATION forming part of Letters Patent No. 525,405, dated September 4, 1894.

Application filed October 23, 1893. Serial No. 488,917. (No model.)

*To all whom it may concern:*

Be it known that I, PHILETUS WARREN GATES, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Inclined Diaphragms of Gy-  
ratory Stone-Breakers; and I do hereby de-  
clare the following to be a full, clear, and ex-  
act description of the invention, such as will  
enable others skilled in the art to which it ap-  
pertains to make and use the same.

My invention relates to improvements in  
removable, hard metal protecting diaphragms  
applied to the ordinary cast metal, inclined,  
transverse diaphragm chutes arranged and  
employed within the framing or casing of gyra-  
tory stone breakers or crushers, for guarding  
the gearing or operating mechanism against  
clogging or impeding substances, such as  
crushed rock, and the fine particles thereof,  
which in the absence of such diaphragms  
would discharge upon the same and cause se-  
rious trouble.

My invention is an improvement on Patent  
No. 265,957, issued October 17, 1882, and its  
object is to provide a surface protecting,  
chilled iron or steel diaphragm of novel con-  
struction and arrangement, and which can be  
more readily fitted in position and removed;  
and also to have the upper section of said  
chilled iron or steel protecting diaphragm, by  
its peculiar construction, shape and arrange-  
ment, serve as a director of the crushed stone,  
while it serves for closing the pocket left be-  
tween the two upper ends of the two short-  
ened lower members, the outer wall, and the  
common cast iron base-diaphragm.

The invention will be more fully under-  
stood from the following specification and  
claims in connection with the accompanying  
drawings, in which latter—

Figure 1. represents a vertical section of a  
gyratory stone crusher with my improvements  
applied thereto. Fig. 2. represents a top plan  
view of my said improvements, the crusher  
head being shown in horizontal section and  
Fig. 3. represents a front elevation of the  
same, the tubular diaphragm extension or  
flange being partly broken away, and the  
broken portions section lined.

In drawings, A is the gyratory shaft of the  
stone crusher, B the diaphragm chute, shown

as cast integral with the frame C of the  
crusher. This diaphragm is necessary in or-  
der to receive and direct the rock, stone, or  
dust, laterally out of the casing, while falling  
from the crusher head and thus keep it away  
from the operating mechanism about the  
lower portion of the gyratory shaft. The dia-  
phragm is provided with a tubular extension  
or flange *b*, which forms a seat for the hori-  
zontal loose collar *b'* which surrounds the  
shaft A and thereby prevents the stone and  
dust from falling down between the shaft and  
the said flange, but at the same time allows  
of the gyratory movement of the shaft by  
sliding on the top of the said flange.

It has been found that the upper surface  
of the diaphragm chute wears away rapidly  
because of the continual striking of the rock,  
&c., thereon, and it becomes necessary to pro-  
vide a protecting means for the same, that  
can be quickly and readily applied and re-  
moved without disturbing other parts of the  
machine. It has also been found in the ordi-  
nary construction that rock, dust, &c., will  
accumulate on the inclined diaphragm be-  
hind the tubular extension or flange *b*, until  
it interferes with the action of the crusher  
head above. I avoid these objections by con-  
structing the removable chilled diaphragm D  
in three separable parts *d*, *d'*, *d''*. The parts  
*d*, and *d'* being similar in form and construc-  
tion to one another, and adapted to be in-  
serted on each side of the tubular extension  
*b* of the diaphragm B; said parts *d*, *d'*, being  
so formed that when in position, they will be  
locked or prevented from sliding out, by their  
ends engaging the sides of the tubular exten-  
sion, but said ends are not of sufficient length  
to meet in rear of said extension or to inter-  
fere with their ready insertion into the cas-  
ing C so as to extend partially about the rear  
half of said tubular extension *b* as indicated  
by the dotted lines *x-x*. The third part *d''*  
of the chilled diaphragm has, as a whole, the  
form approximately of a wedge, the apex or  
highest point forming a ridge *d''* at its mid-  
dle, and the portion each side of said ridge,  
dropping to form two downwardly and for-  
wardly inclined wings *c*, *c'*, the ends of said  
wings resting upon and overlapping the re-  
spective ends of the parts *d*, *d'*, on each side  
of the tubular extension or flange *b*, the ridge

$d^3$  being supported by a ridge shaped extension  $b''$  of the tubular flange  $b$ . It can readily be seen that any rock or dirt falling behind the tubular extension  $b$  will strike the ridge  $d^3$  and immediately slide down one or the other of the inclined wings  $c, c'$ , onto the diaphragm plates  $d, d'$ , which will discharge said rock or dirt at the front of the machine. By this peculiar construction of the diaphragm in three parts, and of such novel form, the whole diaphragm can be instantly changed when desired; and as the parts  $d, d'$ , automatically lock themselves in position when inserted on account of their inner ends extending past the widest portion of the tubular extension they cannot become loose or detached until they are turned or tilted in the casing C so as to disengage their ends from the surface of the tubular extension.

It is obvious that the improved construction of hard metal wearing surface for the inclined diaphragm of stone breakers, would be useful, in the manner as described, whether the base upon which it is applied is made integral with the frame, or constructed separately and bolted in position in the manner described in the Letters Patent hereinbefore referred to.

What I claim as my invention is—

1. The inclined diaphragm chute formed of

a base portion having a tubular extension, and a removable chilled iron or steel wearing portion consisting of three separable parts, the upper part forming a continuation to the two lower parts, substantially as described.

2. The combination with the crusher casing, of an inclined diaphragm chute having a tubular extension and formed of a base portion and a removable wearing portion consisting of a ridge shaped rear part and two forward parts adapted to be overlapped by the ends of the said rear part, substantially as described.

3. The inclined diaphragm chute formed of a base portion, and a removable wearing portion consisting of three self locking parts, one of which is ridge shaped and overlaps the others, substantially as described.

4. The inclined diaphragm chute formed of a base portion and a removable wearing portion consisting of separable parts one of which is ridge shaped, substantially as described.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

PHILETUS WARREN GATES.

Witnesses:

H. W. HOYT,  
J. L. FARGO.