

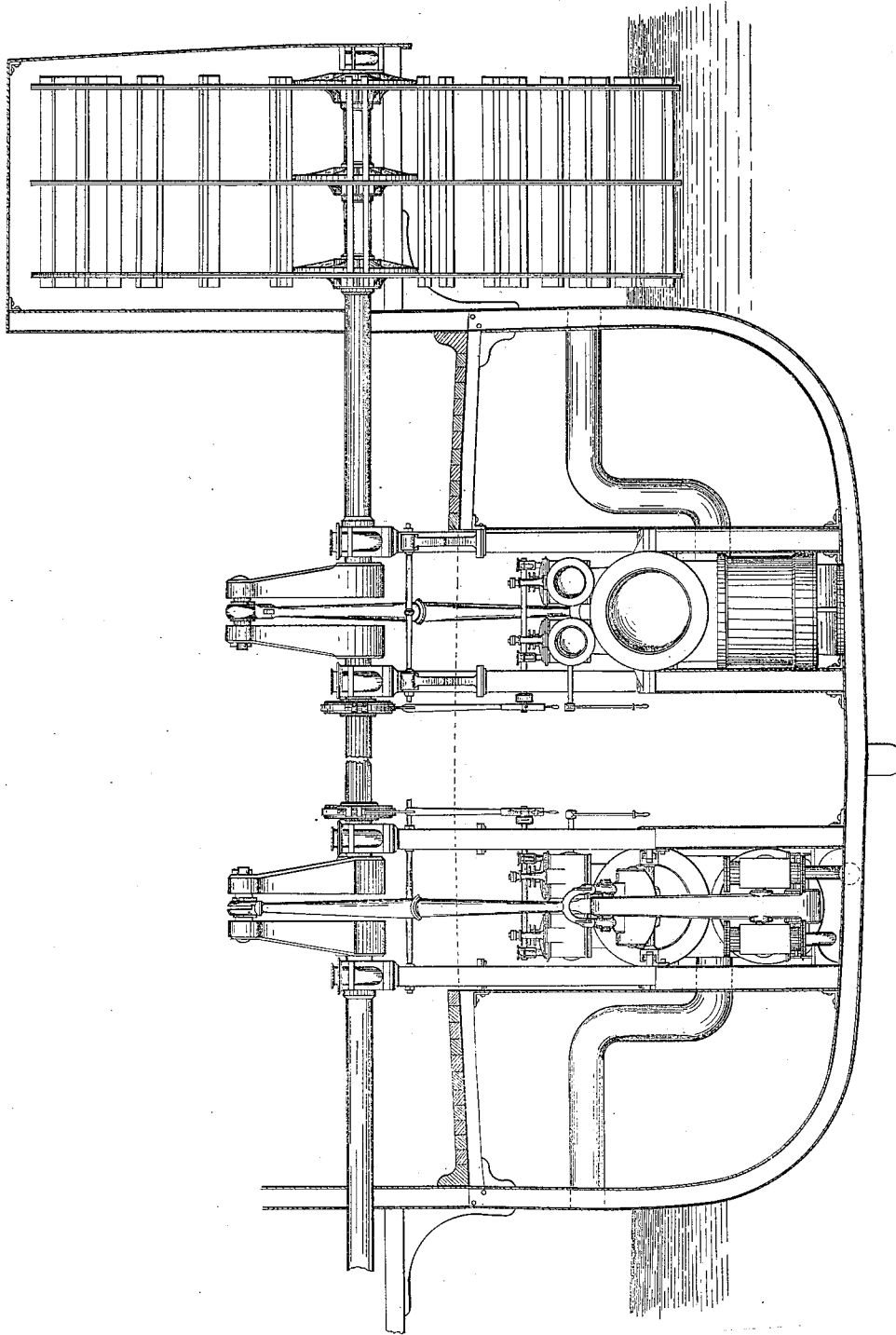
Sheet 1-2 Sheets.

W. A. Lighthall,

Reciprocating Steam Engine,

No. 6,811,

Patented Oct. 23, 1849.



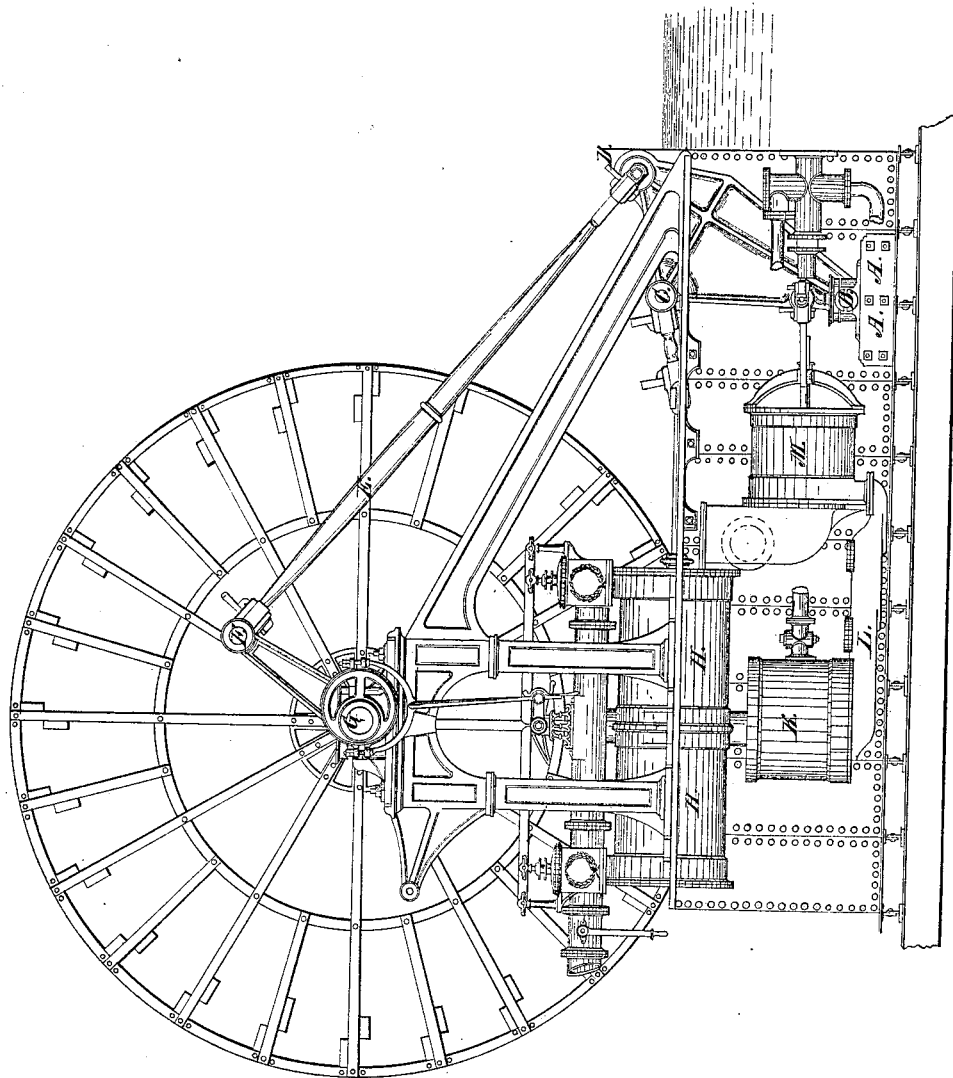
*W. A. Lighthall*

*Sheet 2 - 2 Sheets.*

*Reciprocating Steam Engine,*

*No. 6,811,*

*Patented Oct. 23, 1849.*



# UNITED STATES PATENT OFFICE.

W. A. LIGHTHALL, OF ALBANY, NEW YORK.

## ARRANGEMENT OF THE LEVER HALF-BEAM OF STEAM-ENGINES.

Specification of Letters Patent No. 6,811, dated October 23, 1849.

*To all whom it may concern:*

Be it known that I, WILLIAM A. LIGHT-  
HALL, of the city of Albany, State of New  
York, have invented certain Improvements  
5 in Steam-Engines; and I do hereby declare  
the following is a full and exact descrip-  
tion of the same.

By reference to the accompanying draw-  
ings it will be seen that H H represents the  
10 cylinder lying horizontally, it may be placed  
more or less inclined when so required, K  
the condenser, L the bed plate, M the air  
pump, A A the pillow block fastened to the  
keelsons and bottom of the vessel B the beam  
15 center, C the center of attachment to the  
piston or prime mover, D the upper center  
for "connecting rod" E, F the crank pin,  
G the shaft center.

My improvement consists in reversing or  
20 inverting the pendulum half beam, by fixing  
or placing the main beam center B below  
instead of above, by which means I employ  
a different order of lever, than when work-  
ing the beam as a hanging or pendulum  
25 half beam, because, in the latter the weight  
or resistance to be overcome is between the  
power and the fulcrum, whereas in my im-  
proved application of the half beam and  
mode of working the same, the power is  
30 applied between the fulcrum and the weight  
or resistance to be overcome which mode of  
applying the power enables me to work a  
long crank instead of a short one.

The great advantages in regard to dimin-

ished friction, lessening of weight, greater 35  
facility of fastening or holding the engine,  
when working a long crank instead of a  
short one, together with the fact of doing  
so with the half beam instead of the whole  
beam, are too well known and appreciated 40  
by practical men and those skilled in the art  
of steam engineering to require their being  
set forth at large. It might however at first  
sight appear that in working this order of  
lever (to wit where the power is applied 45  
between the fulcrum and weight) that  
though velocity was gained, yet that power  
was lost, but when we convert the reciproc-  
ating or vibrating motion of the beam into  
a rotary motion by means of a crank the 50  
power lost on the beam is regained by the  
lengthening of the crank lessening the  
weight and friction and giving greater ease  
of movement.

What I claim as my invention and desire 55  
to secure by Letters Patent is—

The arrangement of a horizontal cylin-  
der, with a lever half beam having its ful-  
crum at its lower end, and connecting rod  
attachment at its upper end, with crank 60  
and shaft above the cylinder, substantially  
in the manner and for the purposes herein  
before described.

WM. A. LIGHTHALL.

Signed in the presence of—

HAMILTON MORTON,  
ADOLPHUS GORHAM.