

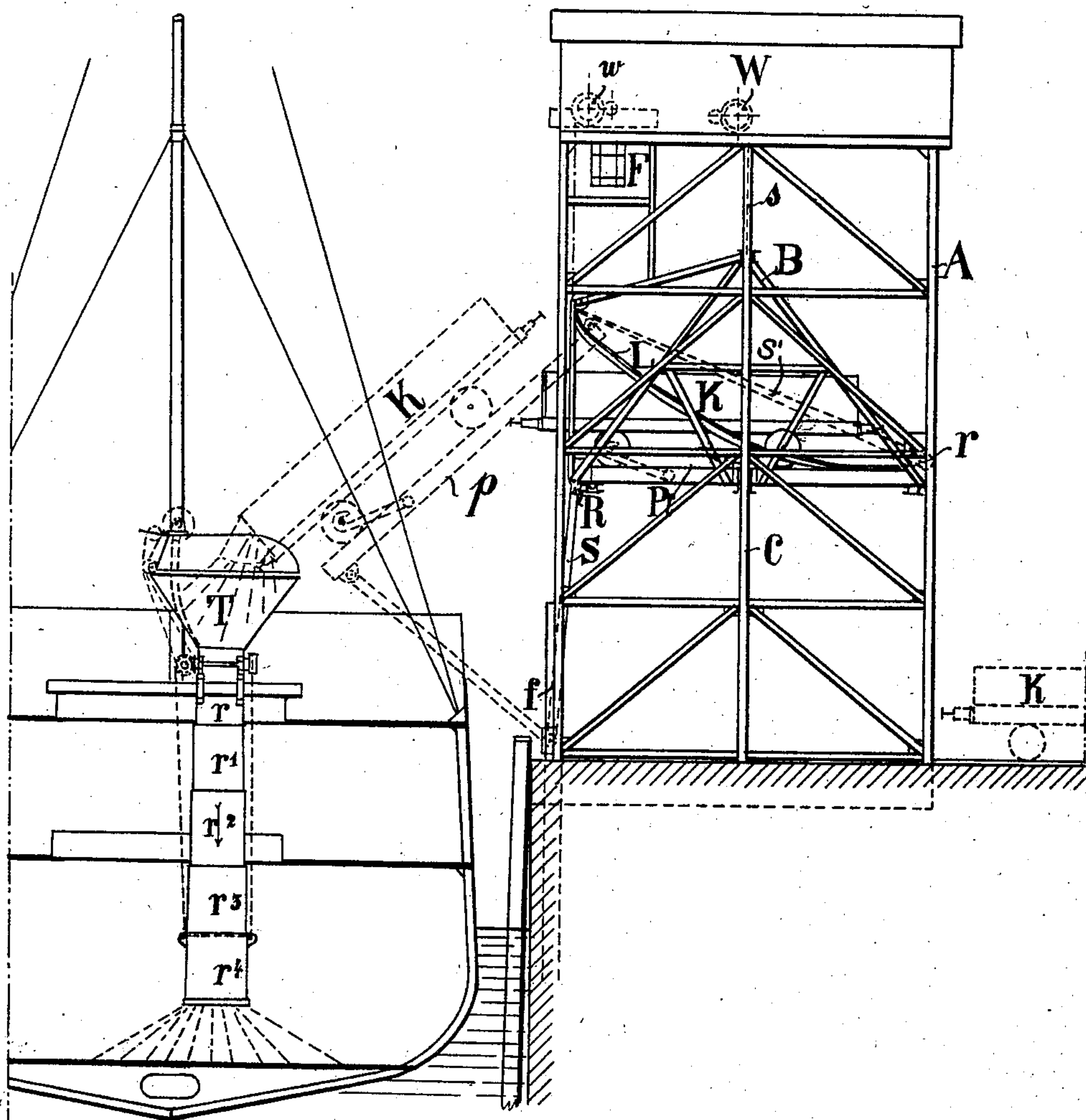
E. G. C. L. MEYER & H. F. J. HOLST.  
 APPARATUS FOR USE IN LOADING COAL AND SIMILAR SUBSTANCES.  
 APPLICATION FILED MAR. 12, 1908.

946,248.

Patented Jan. 11, 1910.

4 SHEETS—SHEET 1.

Fig. 1.



Witnesses  
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4 SHEETS—SHEET 2.

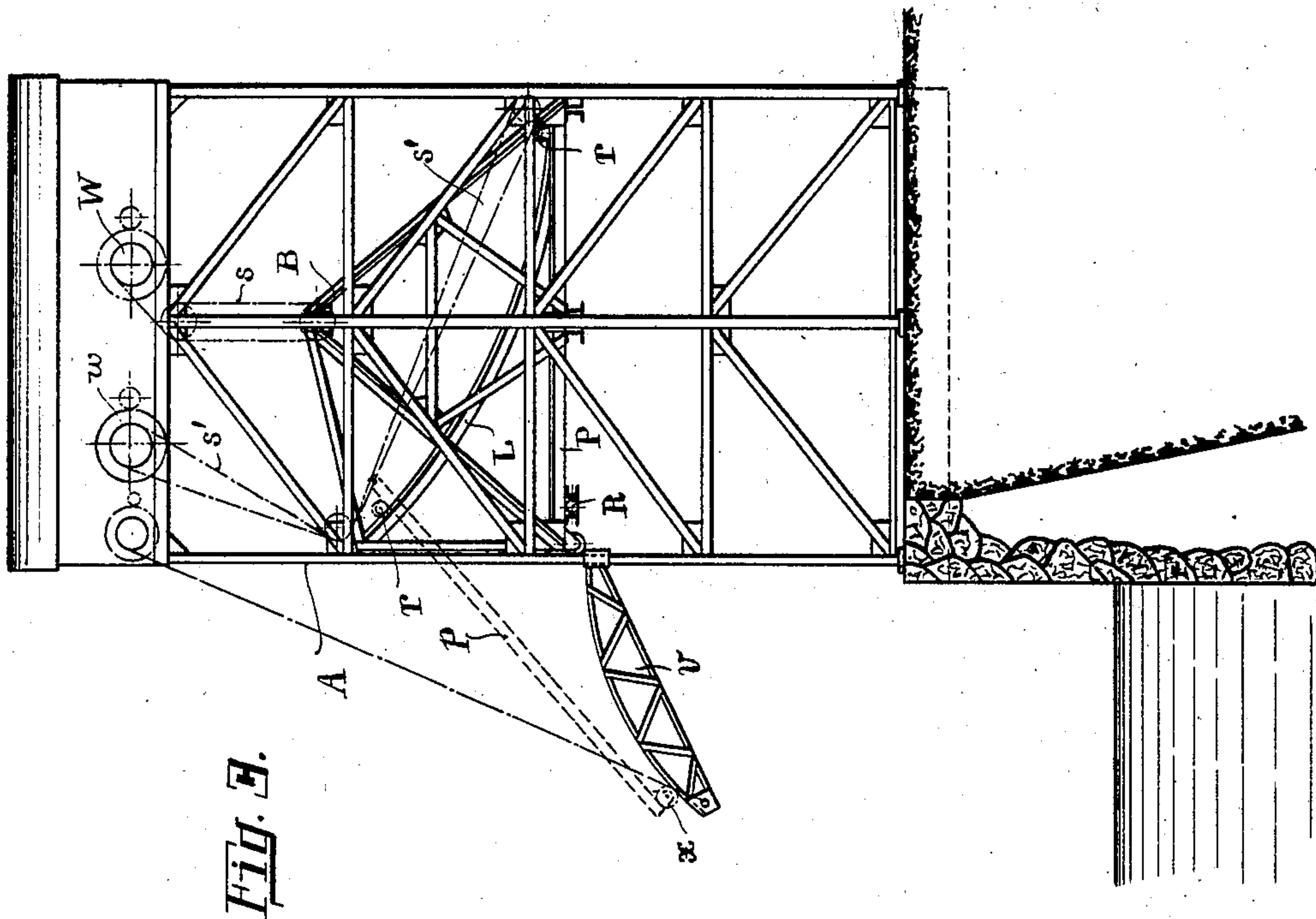


Fig. E.

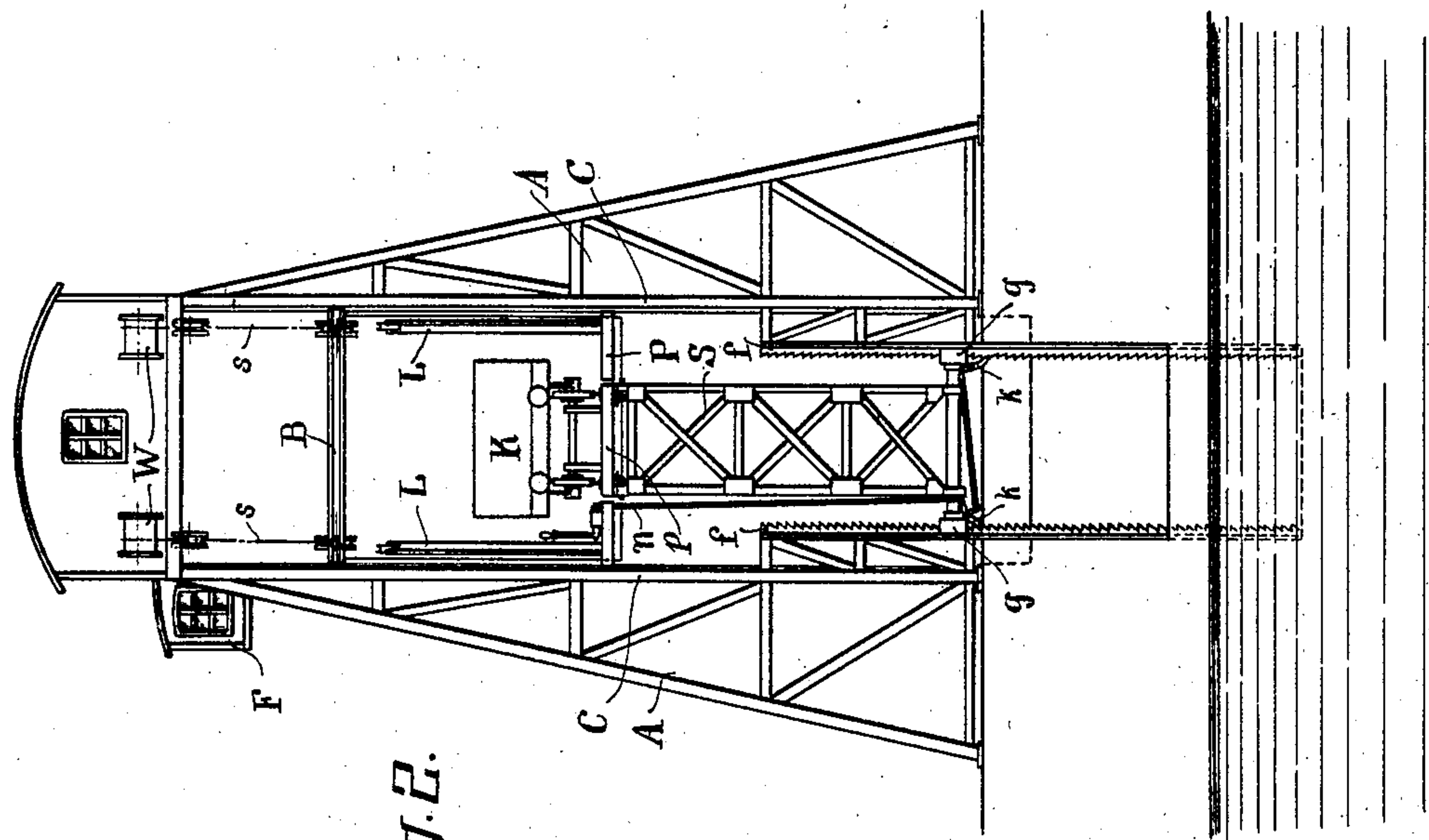


Fig. F.

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4 SHEETS—SHEET 3.

Fig. 4.

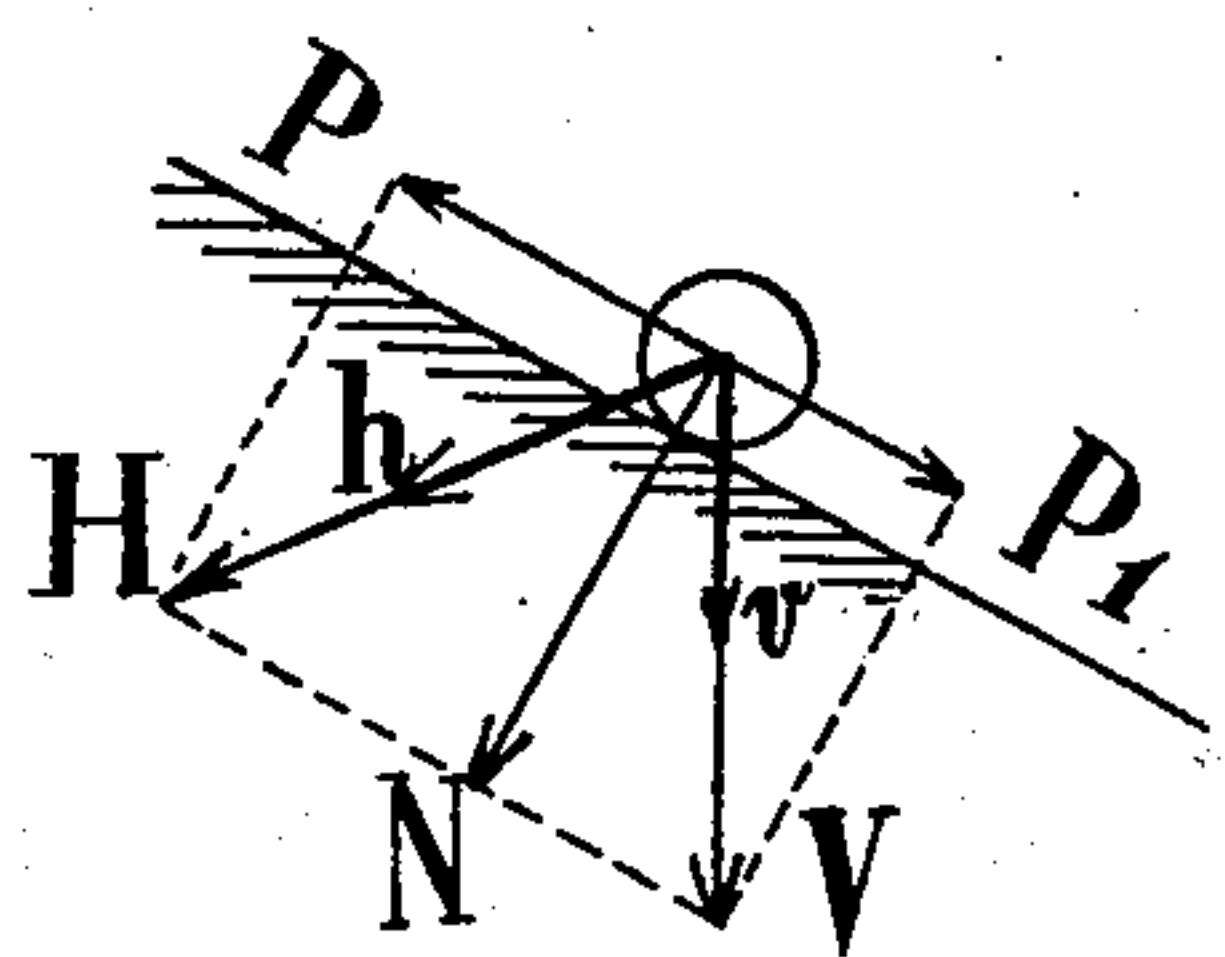
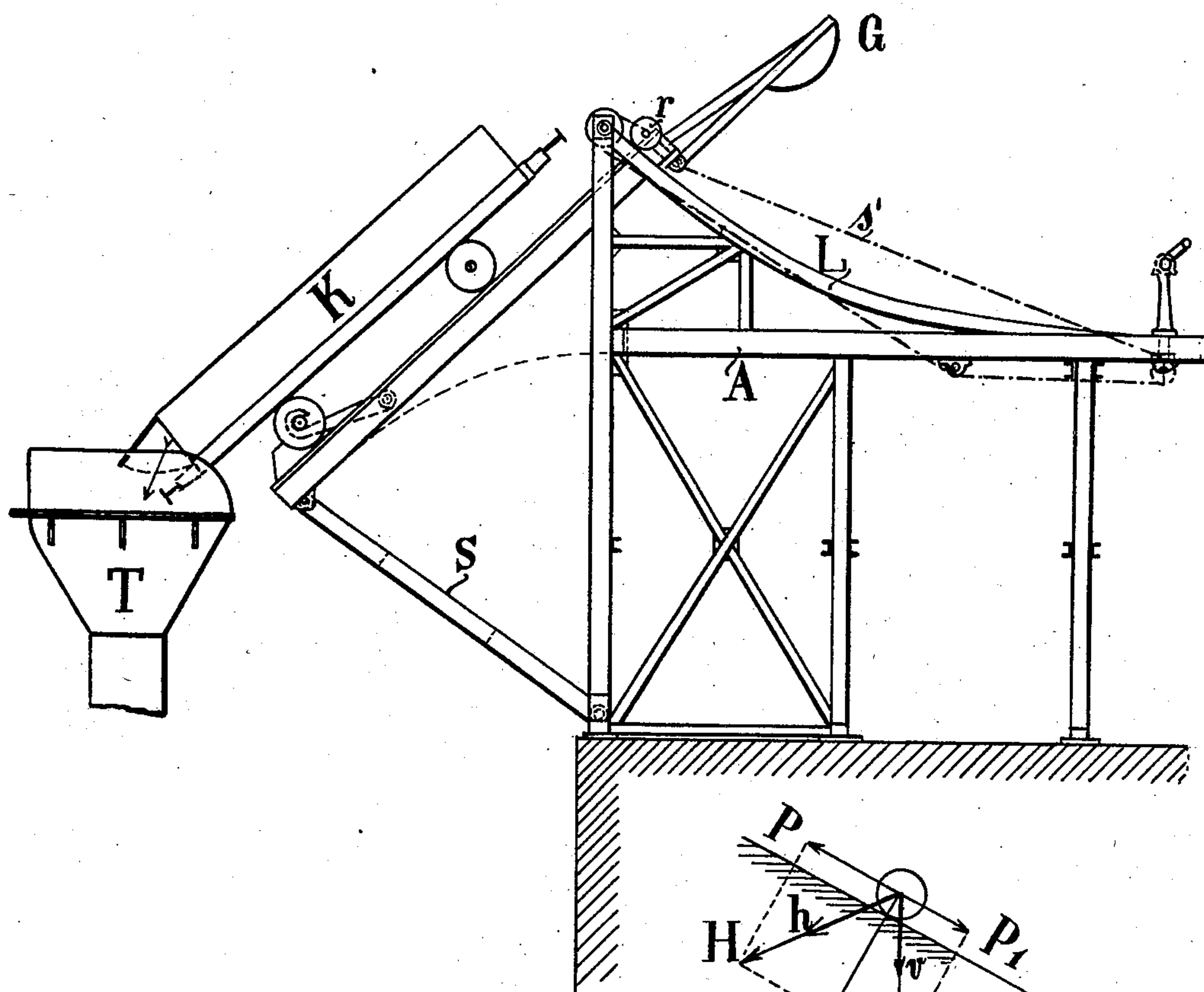


Fig. 6.

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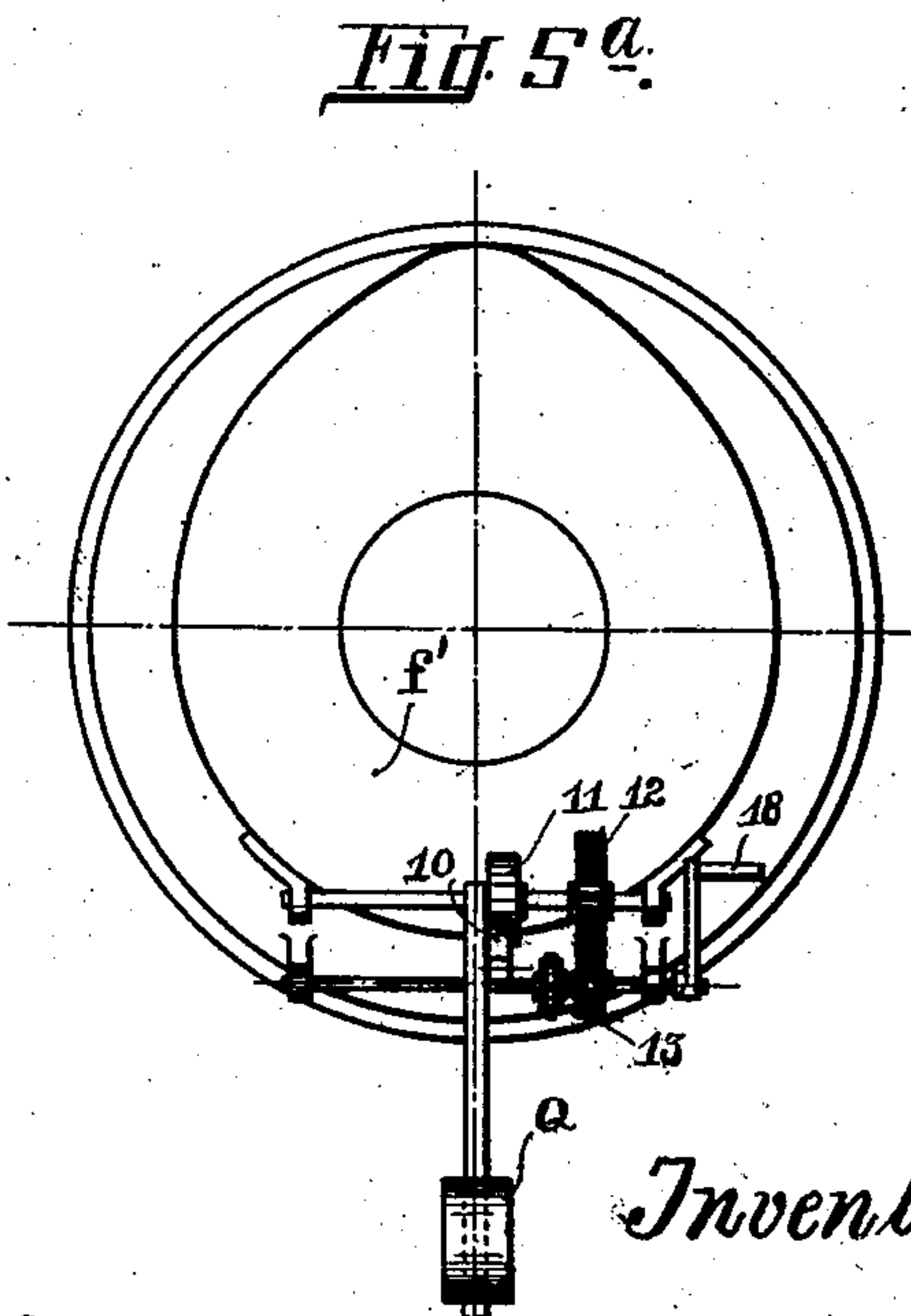
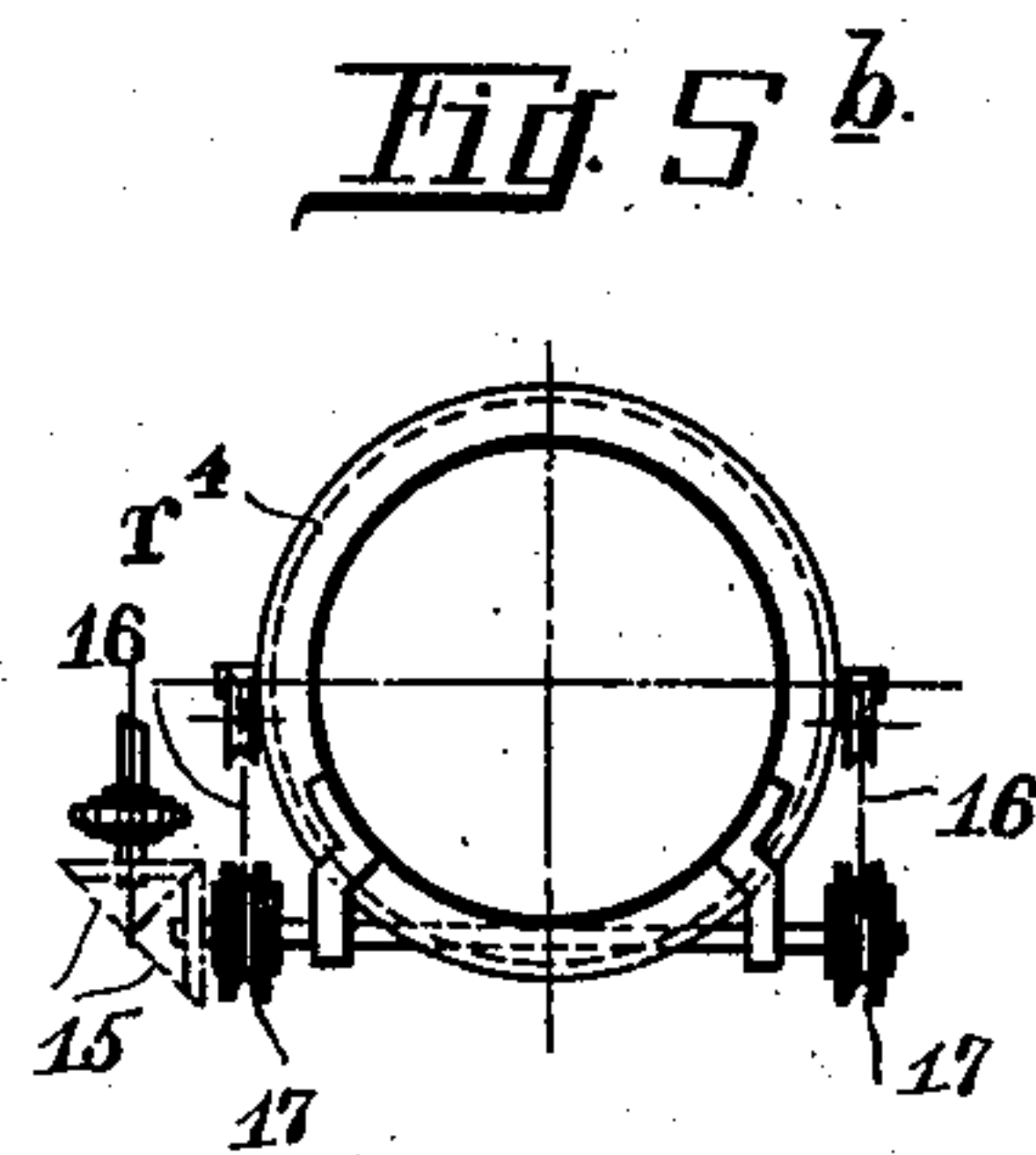
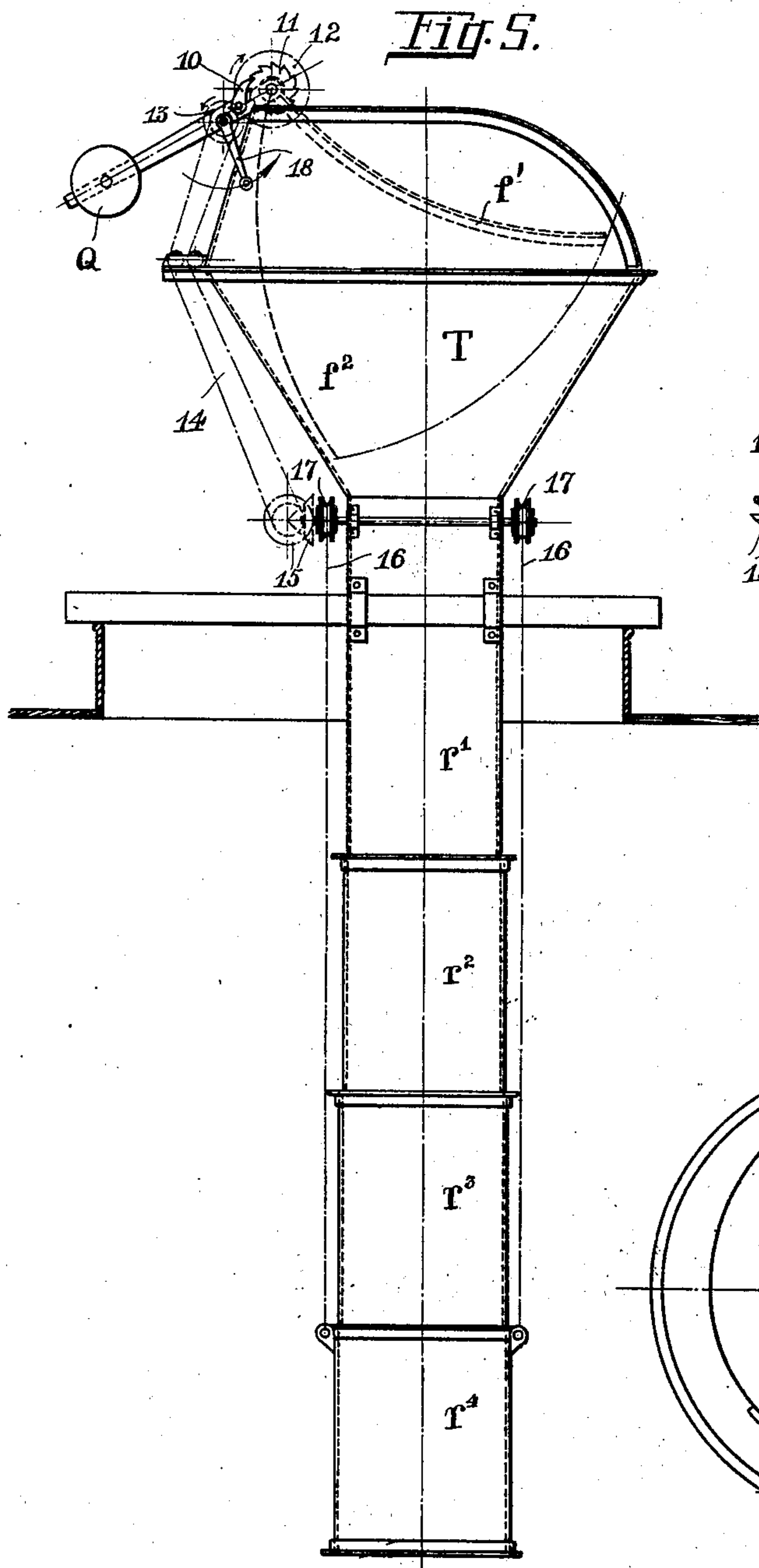


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4 SHEETS—SHEET 4.



Witnesses:

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# UNITED STATES PATENT OFFICE

EDUARD GOTTFRIED CHRISTIAN LEOPOLD MEYER AND HENRY FERDINAND  
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APPARATUS FOR USE IN LOADING COAL AND SIMILAR SUBSTANCES.

946,248.

Specification of Letters Patent. Patented Jan. 11, 1910.

Application filed March 12, 1908. Serial No. 420,608.

*To all whom it may concern:*

Be it known that we, EDUARD GOTTFRIED CHRISTIAN LEOPOLD MEYER, of No. 40 Börne-  
strasse, Hamburg, Germany, and HENRY  
5 FERDINAND JOHANNES HOLST, of No. 128  
Eimsbütterlechaussée, Hamburg, Germany,  
both subjects of the German Emperor, have  
invented certain new and useful Improve-  
ments in or Relating to Apparatus for Use  
10 in Loading Coal and Similar Substances, of  
which the following is a specification.

This invention relates to apparatus for  
use in loading coal and similar substances  
into ships or the like; and it has for its ob-  
15 ject to enable the coal or the other substances  
to be tipped without breaking it, so that it  
will retain nearly its full value.

According to this invention an open  
wagon, *e. g.* railway truck, loaded with coal  
20 or other material is run onto a swing plat-  
form and brought close to the loading hatch-  
way of the ship or the like to be loaded, and  
may be discharged directly into a suitable  
chute emptying into the hold of the ship.  
25 The hopper of the chute is secured upon the  
deck of the ship to be loaded in order that  
the chute may share all the movements of  
the said ship and thus prevent its lower  
end from being displaced relatively to the  
30 heap of coal or the like accumulated in the  
hold.

In the drawings: Figures 1 and 2 are re-  
spectively side and front elevations of one  
construction of loading apparatus accord-  
35 ing to our invention. Figs. 3 and 4 are side  
elevations of modified constructions, also  
according to our invention. Figs. 5 and 5<sup>a</sup>  
are respectively an elevation and a plan view  
of the tubular chute and its hopper; and  
40 Fig. 5<sup>b</sup> is a plan view of the telescopic por-  
tion, the hopper being removed. Fig. 6 is  
a diagrammatic view illustrating the forces  
operating in connection with the modifica-  
tion shown in Fig. 4.

5 Similar characters of reference designate  
corresponding parts throughout the several  
views.

Referring now to the drawings, Figs. 1  
and 2, a traveling stage or hoist B is mount-  
50 ed in any known manner in the framework  
A, so as to be vertically movable between  
guide rails C, by means of ropes *s* and a  
winch *w*. The platform P of the traveling  
stage or hoist B is provided with a loose  
55 middle part *p*, carrying rails on which the

railway truck K is supported, the truck be-  
ing held fast by the hooked catches or the  
like engaging with its axles. This moving  
or tipping part *p* of the platform is pro-  
vided at its rear end, at both sides, with 60  
rollers *r* running on rails L on each side of  
the traveling stage, and moved up and down  
by means of a winch *w* (arranged in the  
winch cabin) operating ropes or chains *s'*  
which are passed over guide rollers and at- 65  
tached to the axles of the rollers *r*.

During the forward travel of the rear end  
of the platform on the rails L, the moving  
or tipping part *p* of the platform is pushed  
outward over carrying rollers R and then 70  
rests on the swinging arm S, which is in en-  
gagement with the tipping platform and  
has its lower end guided on both sides by  
shoes *g* sliding in guides *f*. These guides  
are toothed, so that pawls *k* provided on the 75  
cross piece of the swinging arm S fix and  
support the swinging arm when pushed out,  
whatever the height of the hoist B. During  
the ascent of the hoist B the pawls *k* are  
compelled to engage continuously in the 80  
rack guide *f* by means of a weighted lever  
attached to them. When the hoist B de-  
scends, the pawls *k* are released by a rod *n*  
operated from the platform of the hoist, or  
from the driver's cab F. 85

The moving or tipping part *p* of the plat-  
form and the railway truck are moved out-  
wardly by the winch *w* until the truck has  
reached the necessary outward position for  
discharging the coal or the like which, on 90  
the flap in the front end of the truck being  
opened, slides into the hopper T of the tubu-  
lar chute which is formed of several tele-  
scopic sections *r'*, *r''* etc. The ropes *s'*, serve  
to effect the swing movement of the mov- 95  
able part *p* of the platform, and are wound  
and unwound by the winch *w* during the  
ascent and descent of the hoist. All the  
movements are operated from the driver's  
cab F. The weight of the hoist itself and 100  
that of the swinging arm are nearly com-  
pensated in the usual manner by suitable  
counterbalance weights (not shown).

The chute (Figs. 5, 5<sup>a</sup> and 5<sup>b</sup>) rests firmly  
on the deck of the ship and consists of a 105  
hopper T to which are attached telescopic  
tubes *r'*, *r''* etc. To cause the tubes to tele-  
scope automatically, or the lower end of the  
tube to ascend, the hopper T is provided  
with a flap *f'* that swings back into the posi- 110



tion  $f^2$  when coal or other material is thrown into the hopper. This flap operates a pawl 10 and ratchet 11 to rotate a gear 12 which meshes with a gear 13 driving a chain 14 attached thereto. The chain 14 drives the miter gears 15 which drive a second chain 16 through pulley 17 and which chain is attached to the lowest tube  $r^4$ . As the flap  $f'$  is lowered upon receiving the coal or other material, the chain 16 draws up the lowest of the tubes through the action of the mechanism just described. The result is that a quantity of coal escapes from the tubular portion of the chute, thus lowering the level of the coal in the hopper T and providing sufficient room for the coal discharged from the truck.

When the coal in the hopper has fallen to the resulting normal level, that is to say, to the neck of the hopper, the flap  $f'$  again rises under the influence of the counterweight Q, the operation being as follows: The lever carrying the said counterweight Q is fixed to the same shaft as that upon which the flap  $f'$  turns so that with every movement of the said flap the counterweight Q is correspondingly moved. Loosely mounted about the said shaft of the flap  $f'$  is the ratchet wheel 11 connected to the gear 12 which in turn meshes with the gear wheel 13 of the winding mechanism. As the pawl 10, engaging the ratchet 11, moves with the counterweight Q it will rotate the said ratchet upon the forward movement and thereby gear 12 etc. As soon as the flap  $f'$  is empty, however, the counterweight Q returns the said flap, but the pawl 10 merely glides over the teeth of ratchet wheel 11 and does not advance the same and thereby does not operate the winding mechanism. In order to control the lower discharge outlet, the winding mechanism can also be operated by hand in turning a handle 18. To produce the same effect on the platform  $p$  as is done by the swing lever S, the latter may be replaced by a jib  $v$  (Fig. 3). The jib is provided with rails and is displaceably mounted on the framework A and extends outwardly from same. On this jib the movable platform  $p$  runs, by means of rollers  $x$  mounted on its front end, for the purpose of tipping the truck (not shown). This jib is set each time in accordance with the working altitude of the hoist B, and remains in that position until the work of loading is finished. In order that the level of the jib may be attained with precision each time the hoist is raised, a stop is provided to arrest the travel of the hoist at any desired point. The jib can be drawn in when the tipping apparatus is not working.

In plants where the platform  $p$  has only to tip the truck from a certain constant level, namely that of the railway siding, the swing lever S is mounted on a fixed pivot and is

fitted with two corresponding rails L, on either side of the tipping platform  $p$ . On these rails the rollers  $r$ , attached to the rear end of said platform, run during the outward swing. The outward and return swing of the platform  $p$  and truck K is effected by means of ropes or chains  $s'$  attached at  $r$  and operated by a winch  $w$ ; or, automatically, (Fig. 4) under the influence of the action of the weight of the load of coal in the truck, and a counterweight G attached to the roller end of the tipping platform  $p$ . The rails L receiving the roller  $r$  in this modification are shaped in a curve which must be constructed in accordance with the diagram of forces shown in Fig. 6. In such construction, during the outward swing of the loaded truck, the horizontal force H in the direction of the moving platform out-balances the vertical force V in such a manner that  $P^1 = P_1$ , and the end of the platform rolls upward in the rails L. In the extreme outward position the curve is of such a form that  $H=V$  and therefore  $P^1=P_1$ . During the emptying of the truck, the value of H correspondingly falls and  $P^1$  becomes less than  $P_1$  whereupon the platform end runs backward again. The velocity of the movements is regulated by a suitable brake (not shown).

The method of operating the tipping apparatus is as follows: The railway truck K is run on to the platform and is prevented from shifting by means of the hook catches. The hoist with the attached swinging arm S (Figs. 1 and 2) or with a jib  $v$  (Fig. 3) without a swinging arm, is raised to the desired altitude by means of the winch  $w$  and the movable platform  $p$  is run out on the rails L by means of the winch  $w$ , in which movement it first slides over the rollers B, and then rests on the swinging arm (supported in position by the pawls), or runs along the track on the jib  $v$  (Fig. 3). In this way the platform  $p$  reaches a projecting and inclined position, the slope being equal to the angle of slip for the coal. The workman standing by the hopper T of the chute next allows the coal to slide into the chute, which is always kept filled with coal up to the neck of the hopper and is supported from the bottom of the ship, so that no coal can escape unless the bottom tube is raised. When additional coal enters the hopper, the lower end of the tubular portion of the chute is raised, by means of winding mechanism arranged on the neck of the hopper, to such an extent that the coal already present in the tube falls out and leaves room for an equal quantity to follow. When the railway truck is emptied, the tipping platform  $p$  is allowed to run back on the rails L, and the swinging arm S (Figs. 1 and 2) is also returned to its original position. Then in the arrangement shown in Figs. 1 and 2,



the pawl  $k$  of the swing lever  $S$  is released; and the hoist, with the empty truck, is lowered by means of the winch  $w$ , and the railway truck  $x$  run away from the tipping apparatus. In the modification according to Fig. 3 the jib remains in its extended position.

We claim:—

1. In an apparatus of the character set forth: a movable platform; movable means to support one end of said platform; forwardly directed guides to support the other end of said platform; and means to advance the said platform whereby it moves forwardly upon said movable supporting means and is raised at its other end by said guides, tipping into unloading position.

2. In an apparatus of the character set forth: a movable platform; a movable jib adapted to support one end of said platform; forwardly directed guides to support the other end of said platform; and means to advance said platform on said guides to bring same into unloading position.

3. In an apparatus of the character set forth: a framework; a vertically movable platform therein; a jib pivotally connected to said platform; a member carried by said platform, relatively movable thereto and adapted to support a suitable truck and its front end and being supported by said jib; forwardly directed guides to support the other end of said member; and means to advance said member on said guides relatively to said platform to bring same into unloading position.

4. In an apparatus of the character set forth: a framework; a vertically movable platform therein; a swinging jib pivotally connected to said platform; a member supported by said platform, relatively movable with respect to same and adapted to support a suitable truck; forwardly directed guides carried by said platform; means carried by said movable member to hold one end of same to said swinging jib, and means to hold the other end of same to said guides; and means to advance said member such that one end swings outwardly on said jib and the other is raised by said guides, tipping said member into unloading position.

5. In an apparatus of the character set forth: a framework; a vertically movable platform therein; movable means to support the front end of said platform; a rack carried by said framework affording vertical guides for said movable supporting means; pawls carried by same and engaging said rack; means to release said pawls; means to support the rear end of said platform; and means to advance said platform whereby the said platform moves forwardly on its forward support and is raised at its other

end by said rear support, tipping into unloading position.

6. In an apparatus of the character set forth: a movable platform; means to support the forward end of same; suitably curved guides to support the other end of same, and to permit said platform to automatically advance, when loaded, to bring same into unloading position; and a counterweight secured to said platform adapted in conjunction with the said guides to automatically return the said platform when unloaded.

7. In an apparatus of the character set forth: a movable platform; means to support the forward end of same; suitably curved guides to support the rear end of same; and a counterweight secured to the platform, the said platform being so supported and the curvature of the guides such that the outwardly acting force exceeds, when the platform is loaded, the return force due to the counterweight, causing the said platform to move outwardly to its extreme and unloading position at which the said forces are substantially balanced.

8. In an apparatus of the character set forth: a movable platform; a jib supporting the forward end of same; suitably curved guides to support the rear end of same; and a counterweight secured to the platform, the said platform being so supported and the curvature of the guides such that the outwardly acting force exceeds, when the platform is loaded, the return force due to the counterweight, causing the platform to move outwardly to its extreme and unloading position at which the said forces are substantially balanced.

9. In an apparatus of the character set forth: a framework; a vertically movable platform therein; a swinging jib pivotally connected to said platform; a member supported by said platform, relatively movable with respect to same and adapted to support a truck; suitably curved guides carried by said platform; means to hold one end of said movable member to said swinging jib, and means to hold the other end of same to said guides; and a counterweight secured to said movable member such that the outwardly acting force due to the action of the weight of the loaded member exceeds the return force and causes the movable member to move outwardly to its extreme and unloading position at which the said forces are substantially balanced.

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