

No. 758,857.

PATENTED MAY 3, 1904.

J. A. SANER.

SHIP LIFT.

APPLICATION FILED OCT. 3, 1903.

NO MODEL.

FIG. 2.

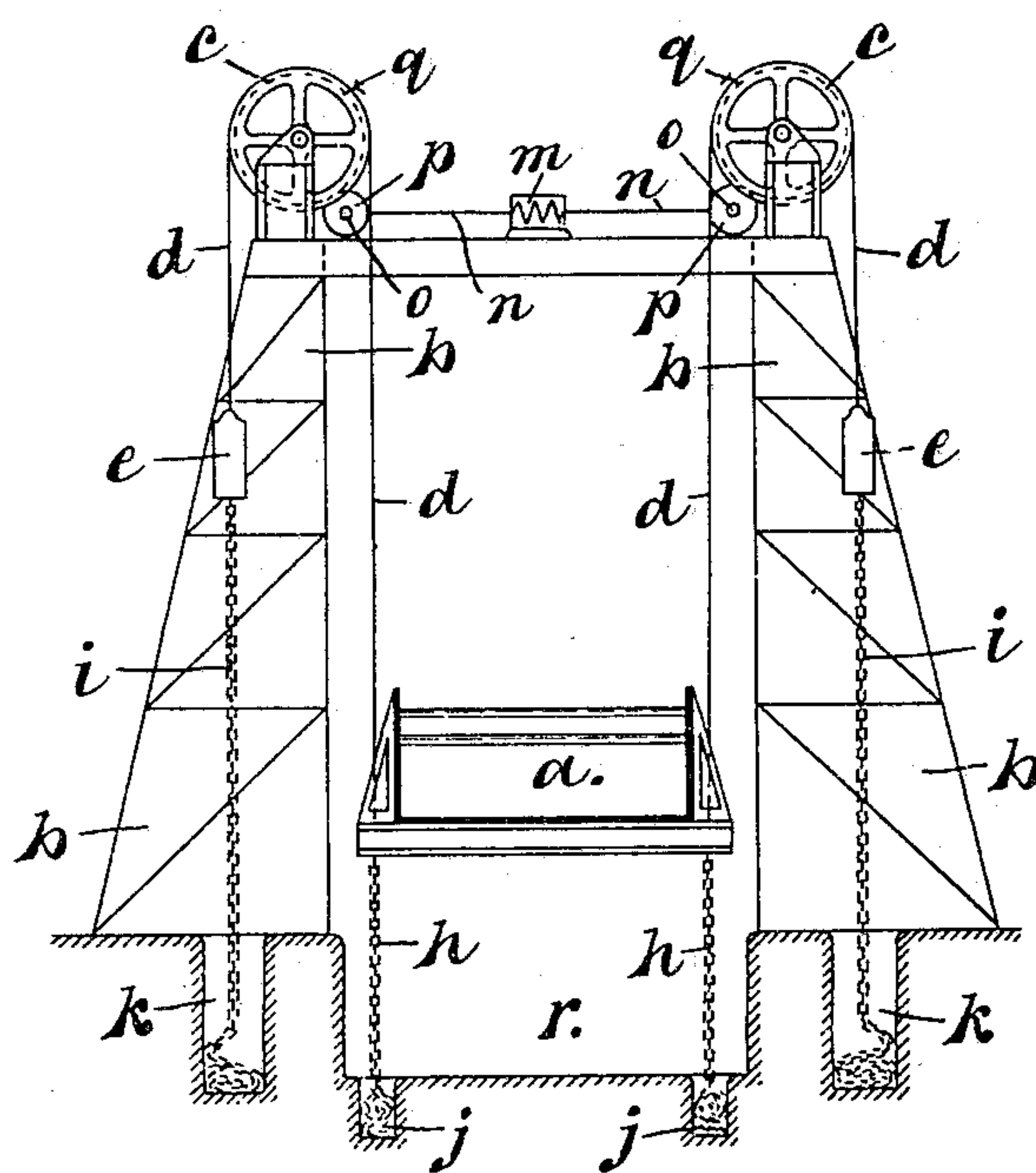
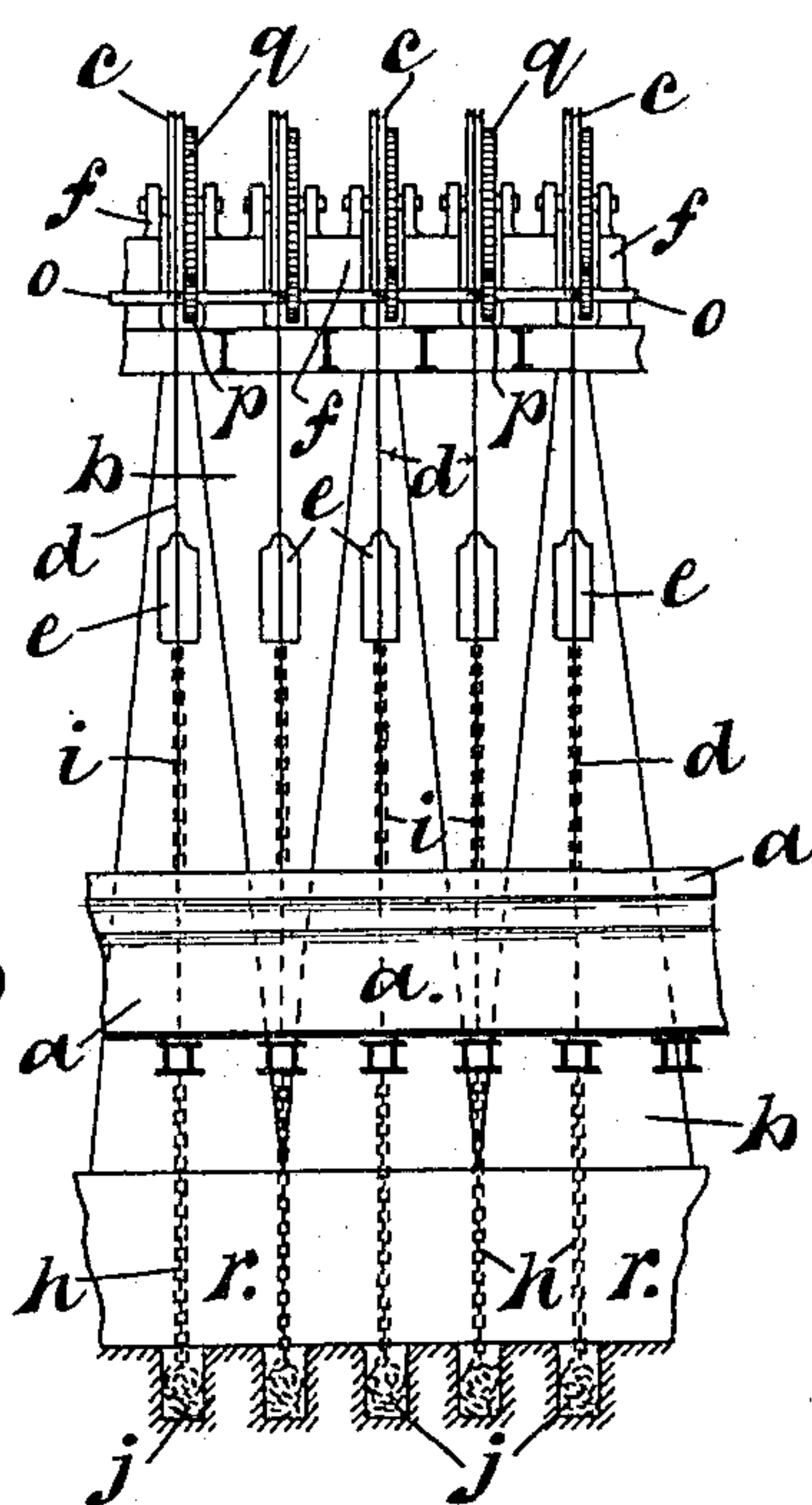


FIG. 1.



WITNESSES

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JOHN A. SANER, OF NORTHWICH, ENGLAND.

SHIP-LIFT.

SPECIFICATION forming part of Letters Patent No. 758,857, dated May 3, 1904.

Application filed October 3, 1903. Serial No. 175,615. (No model.)

To all whom it may concern:

Be it known that I, JOHN ARTHUR SANER, a subject of the King of England, and a resident of Northwich, in the county of Chester, Eng-
land, have invented certain new and useful Im-
provements in or Connected with Ship-Lifts,
of which the following is a specification.

This invention has reference to the lifting and lowering of ships of both small and large
size or transporting them from water at one
level to water at another level, as on naviga-
ble canals, rivers, lakes, &c., and for raising
ships out of the water for various dry-dock-
ing purposes.

Some of the objects and advantages of the
invention are hereinafter set forth.

The lifting apparatus comprises a tank,
trough, or structure in which the ship or ves-
sel is floated or rests, as the case may be, and
a frame or scaffolding of girder-work or the
like along each side of the lift-body having
upon their upper parts a series of pulleys
over which round, flat, or like ropes connect-
ed at one end with the lift-body pass and
each having on the other end a counterbal-
ance-weight, these pulleys or ropes being ar-
ranged in multiple and parallel and compara-
tively closely together and all driven or con-
trolled together by power distributed through
shafting and tooth-gearing.

The invention is illustrated in the accom-
panying drawings, in which—

Figure 1 is a side elevation, and Fig. 2 a
cross-section.

Referring to the drawings, *a* represents the
tank or structure in which the ship or vessel
is floated or rests, and *b* represents the frames
or scaffolding of girder-work which are erect-
ed on the ground or foundation and disposed
along each side of the tank or structure *a*.

c represents a plurality of rope-pulleys over
which the ropes *d*, connected at one end with
the lift-body *a*, pass, and *e* represents the
counterbalance-weights of the other end of
these ropes *d* for counterbalancing the weight
of the body *a*. The pulleys *c* and the wire
ropes or bands *d* are arranged in multiple and
parallel and closely together, the pulleys be-
ing supported on bearings *f*, fixed on the top
of the frames *b*.

To the vessel or lift-body *a* and to the coun-
terbalance-weights *e* chains *h* and *i* are fixed
or suspended, respectively, these chains being
of the same weight per lineal foot as the wire
ropes *d*. The chains *h* and *i* are arranged to
work in the case shown in wells *j* and *k*, re-
spectively, and when the lift-body *a* is being
lowered the chains *h* will pile up on the bot-
tom of the chamber *j*, so that their weight is
carried by the bottom of these chambers and
does not act upon the body, and, concomi-
tantly, in raising the chains *i* will be lifted
up and off the bottom of the wells *k*, and the
greater portion of their weight will thus be
acting on the body in the upward direction,
tending to support it. By these means the
weights of the ropes *d* inside the pulleys *c*,
together with the chains *h*, will always balance
the portion of the ropes *d* outside the pulleys,
together with the chains *i*, in all positions.
Therefore if the aggregate weight of the
counterweights *e* be equal to the weight of
water in the tank or body *a* at medium water-
level plus the weight of the tank equilibrium
is obtained in the whole dynamical portion of
the machinery—that is, so long as the water
is of medium level the whole system is bal-
anced.

To put the apparatus in motion—that is, to
raise the lift or to lower it—with or without a
load, by taking water out of the tank or body
a and bringing it below the medium water-
level when at the bottom position the weight
tending to lift the lift would raise it, and
then to lower it when at the top, with or with-
out a load, by adding a small quantity of water
to the tank or body *a* and bringing it above
medium water-level it, the body, would lift
the weights and it would fall to the bottom.
In these actions the chains *i* and *h* would be
raised off and piled up on the bottom of their
respective wells *k* and *j* alternatively. If this
method is adopted, then fuel would be saved,
and the machinery or power used in connec-
tion with the driving or operation of the rope-
wheels *c* would be used only as auxiliary power
to regulate the movement and synchronize
the actions of all the parts and produce a
harmonious operation of the system as a whole
and to prevent undue acceleration in either di-

rection. It would, however, be possible to rely entirely on electric, steam, or other power motor to work the apparatus. This machinery in the case shown comprises a motor *m*—
 5 say an electric motor—driving-shafts *n*, which work and drive through suitable worm or toothed gearing, two counter-shafts *o*, parallel with the axes of the wheels *c* and having upon them pinions *p*, meshing with spur-wheels *q*,
 10 fixed on or to the rope-wheels *c* and revolving therewith. Thus as the motor revolves so the shafts *o* are revolved, and with them all the toothed wheels *q* and rope-wheels *c* in unison. The motor *m* would be suitably placed
 15 so as to distribute the power, and counter-shafts may extend between the shafts *o*, so that these two shafts would be geared up to several points in order to equally distribute the power on the line-shafts *o*. The trough or
 20 tank *a* would be lowered into a dry-dock or basin *r* with a water-tight connecting-gate and movable pieces in any known way; but as there might be a tendency of the trough to rise when in connection with the lower pound
 25 series of catches or stops of suitable shape may be arranged to hold it down during the period the vessel was entering or leaving. During the transition stage at the top no damage could arise, as receiving-blocks for the
 30 counterweights *e* may be provided, which they would come upon in this position, or in any case they would be quite or nearly touching the ground.

In the case of lifts where the trough or tank
 35 *a* is in width about the depth it may be of semicircular form, thereby saving considerable weight.

A lift apparatus according to this invention requires no deep foundations, and the steel-work or brickwork is above ground. The
 40 weight being evenly distributed in the tank or trough *a* and the support being also evenly distributed, the metal-work of the tank or trough may be quite lightly built, and consequently
 45 the employment of heavy girders, such as are necessary when the weight is supported at the center only, are not required. The machinery being self-controlled with its own
 50 balance-weights, one trough only need be erected instead of two, as is usually the case in hydraulic lifts, and if two be erected they

may be both up or both down together to suit the exigencies of traffic. Further, by the invention any speed of movement may be obtained, and there is no tendency to uneven
 55 stress on the ropes.

Having now particularly described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A lift apparatus for navigable vessels, 60 comprising a tank for carrying the vessels; an upwardly-projecting erection along each side of same; a plurality of pulleys along on each of and on the top of said erections; ropes along each side passing over the pulleys and 65 attached at one end to the tank; balance-weights fixed on the other end of the said ropes; chains suspended from the weighted ends of said ropes, and from the tank, the lower portions of which are adapted to be
 70 lowered onto and rest on, and be moved off their support, as the tank and weights move up and down; and means for controlling the movements of the apparatus; substantially as set forth. 75

2. A lift apparatus for navigable vessels, comprising a tank *a* for carrying the vessels; erections *b* along each side of same; a plurality of pulleys *c* along on each of, and on top of said frames; ropes *d* along each side; 80 passing over the pulleys *c*, and attached at one end to the tank *a*; and balance-weights *e* fixed in the other ends of the said ropes; chains *i* suspended from the weighted end of the ropes *d*; chains *h* suspended from the 85 tank *a*; the lower portion of said chains being adapted to be lowered onto and rest on and be moved off their supports, as the tank *a* and weights *e* move up and down; spur-wheels *q* in connection with each of said pulleys *c*; a shaft *o* parallel with the axes of each set of the wheels *c*; pinions *p* on said shafts *o* meshing with the spur-wheels *q*; and a motor connected with, and adapted to operate said shafts *o*; substantially as set forth. 90 95

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

JOHN A. SANER.

Witnesses:

ERNEST R. ROYSTON,
 FRANK E. FLEETWOOD.