

No. 812,206.

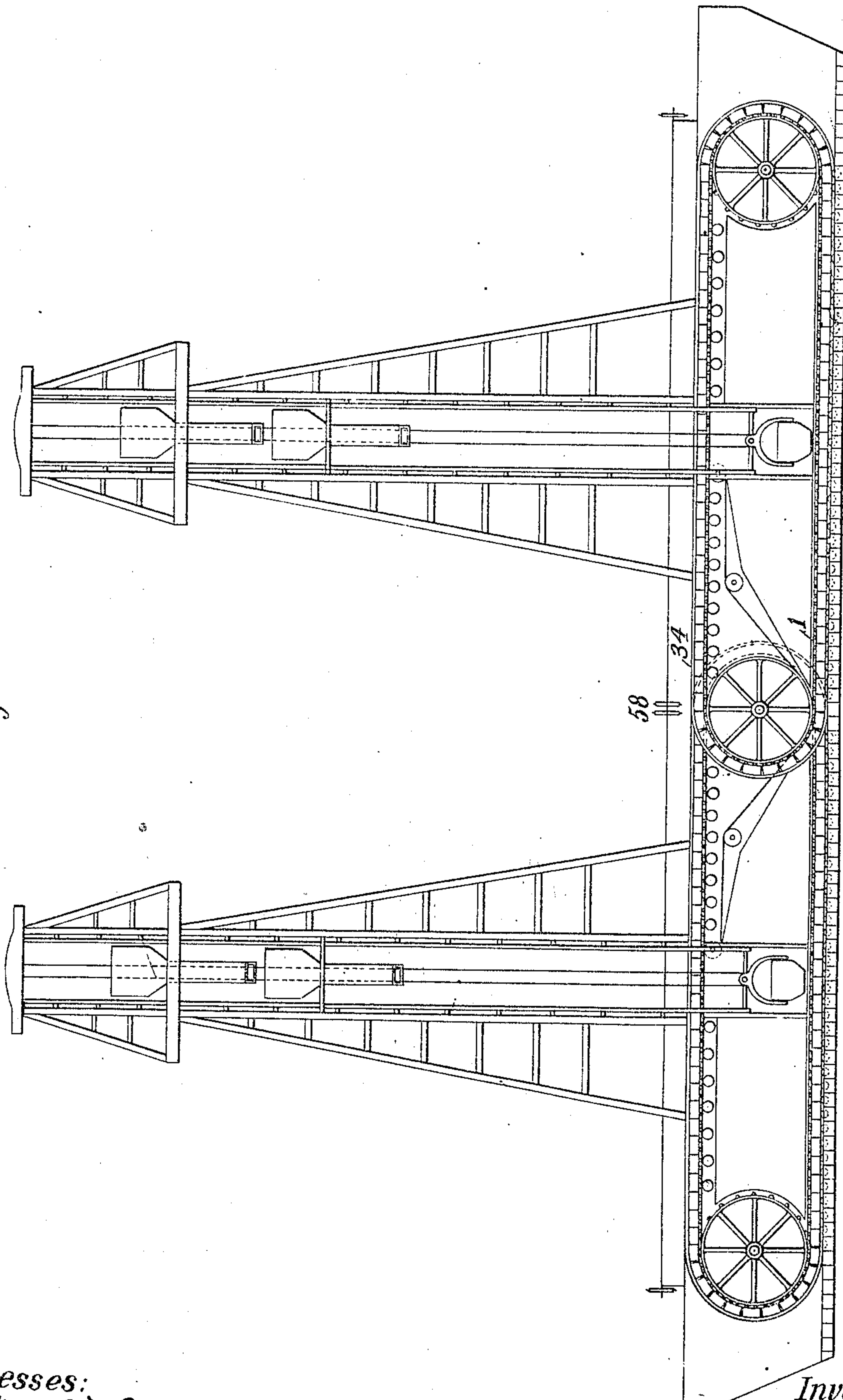
PATENTED FEB. 13, 1906.

M. S. IVERSON.  
FLOATING ELEVATOR OR LIGHTER.

APPLICATION FILED MAR. 14, 1904.

4 SHEETS—SHEET 1.

Fig 1



Witnesses:  
Thos. J. Byrnes  
A. Denham

Michael S. Iverson,  
by Kerr, Page & Cooper Attys.

Inventor

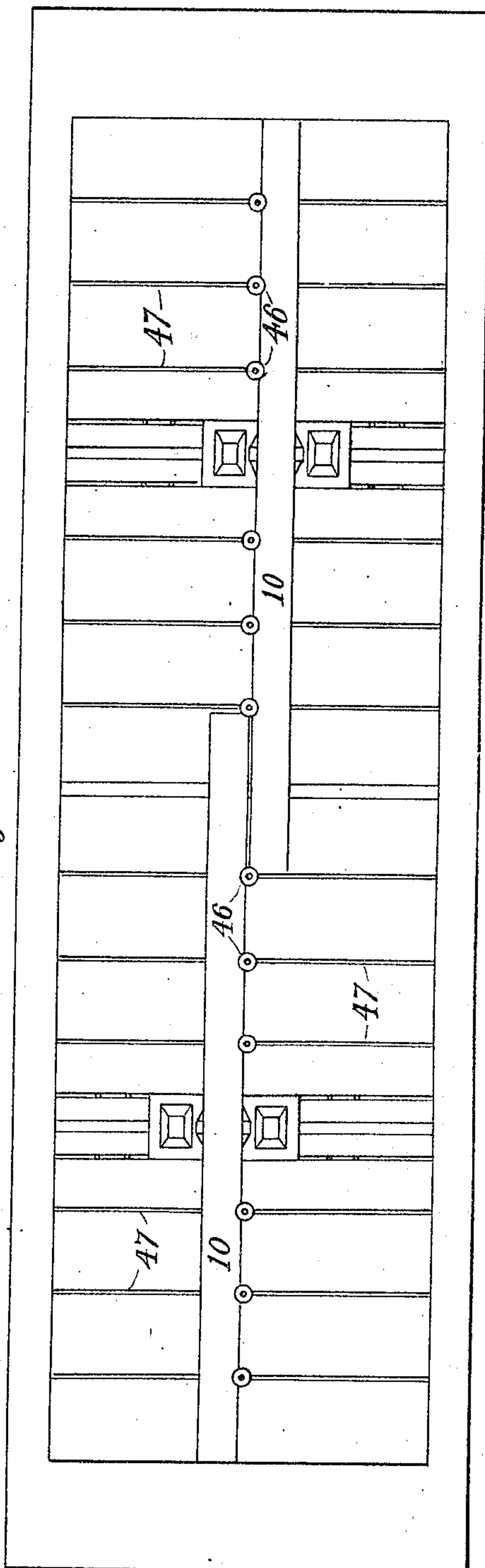
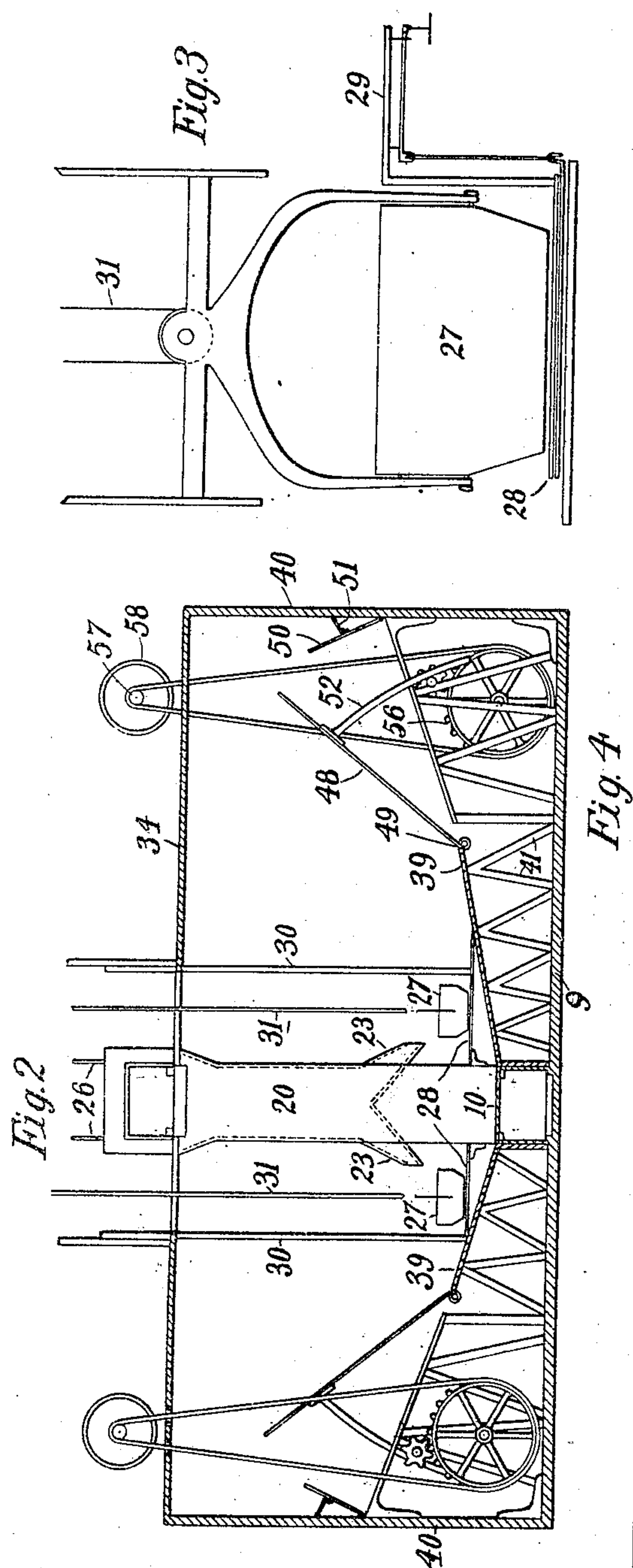
No. 512,206.

PATENTED FEB. 13, 1906.

M. S. IVERSON.  
FLOATING ELEVATOR OR LIGHTER.

APPLICATION FILED MAR. 14, 1904.

4 SHEETS—SHEET 2.



**Witnesses:**

Witnesses:  
Thos. J. Byrne  
S. Duham

Michael S. Linton, Inventor

by Kerr, Page & Cooper Attys.



No. 812,206.

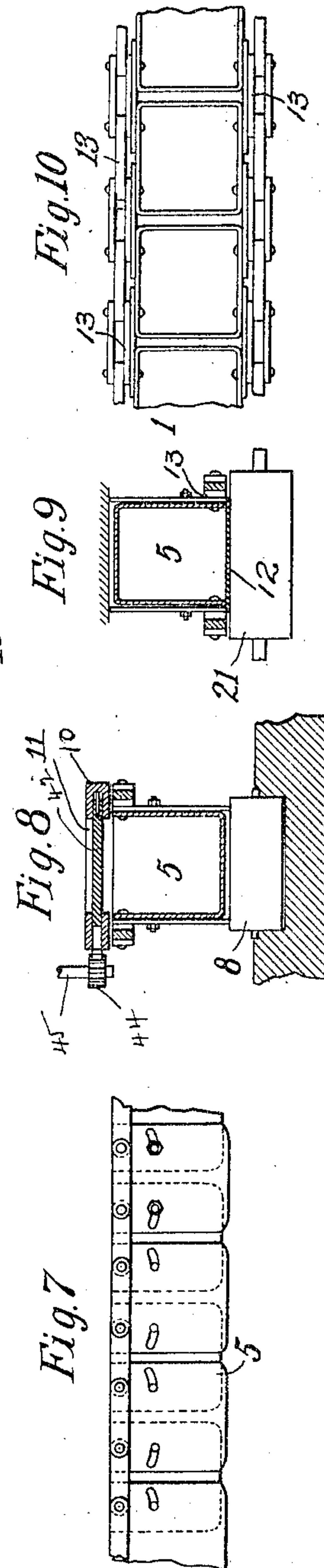
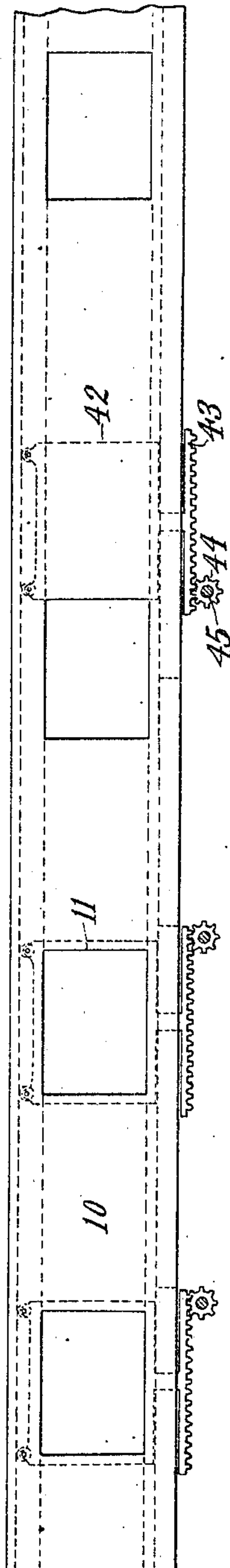
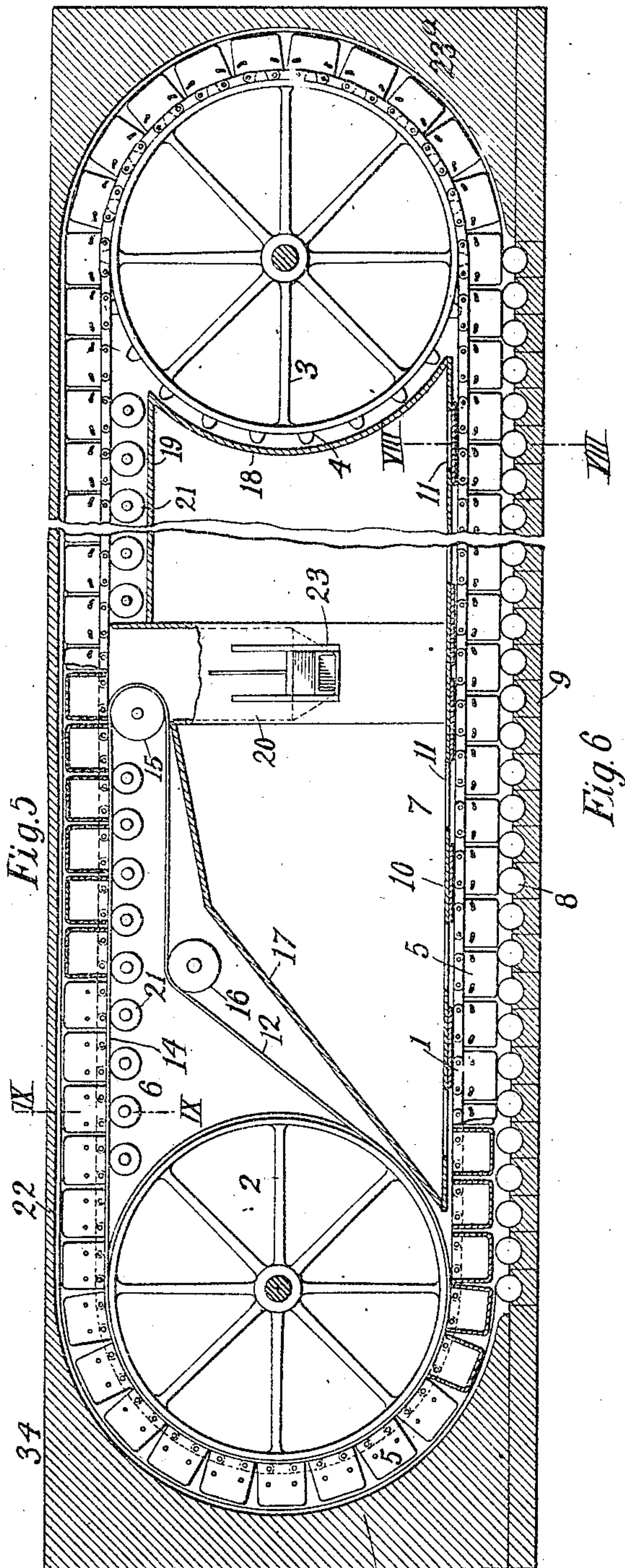
PATENTED FEB. 13, 1906.

M. S. IVERSON.

FLOATING ELEVATOR OR LIGHTER.

APPLICATION FILED MAR. 14, 1904.

4 SHEETS—SHEET 3.



Witnesses:

Thos. J. Byrnes  
A. S. Dunham

Michael S. Iverson, Inventor

by Kerr, Page & Cooper Attys

No. 812,206.

PATENTED FEB. 13, 1906.

M. S. IVERSON.  
FLOATING ELEVATOR OR LIGHTER.

APPLICATION FILED MAR. 14, 1904.

4 SHEETS—SHEET 4.

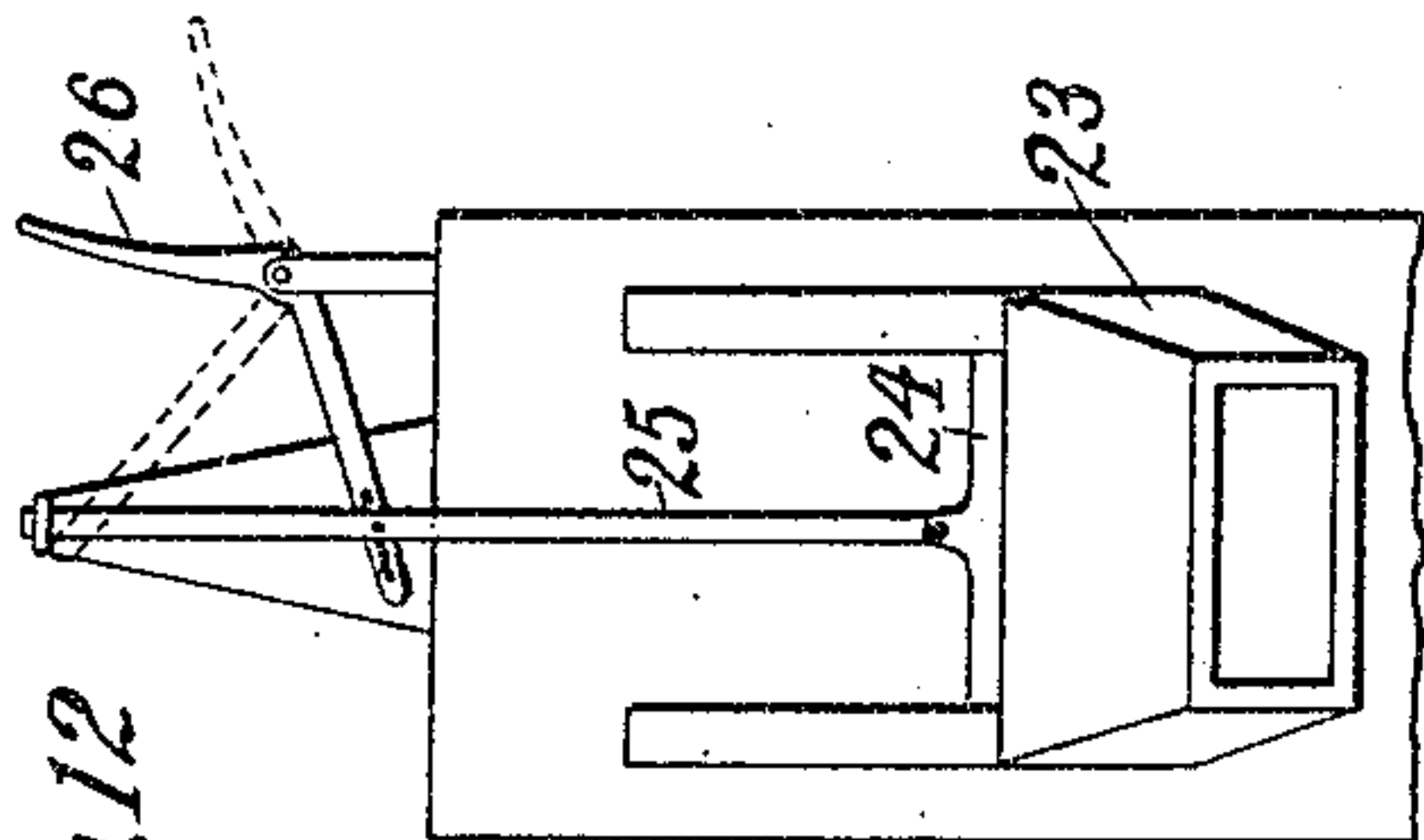


Fig. 12

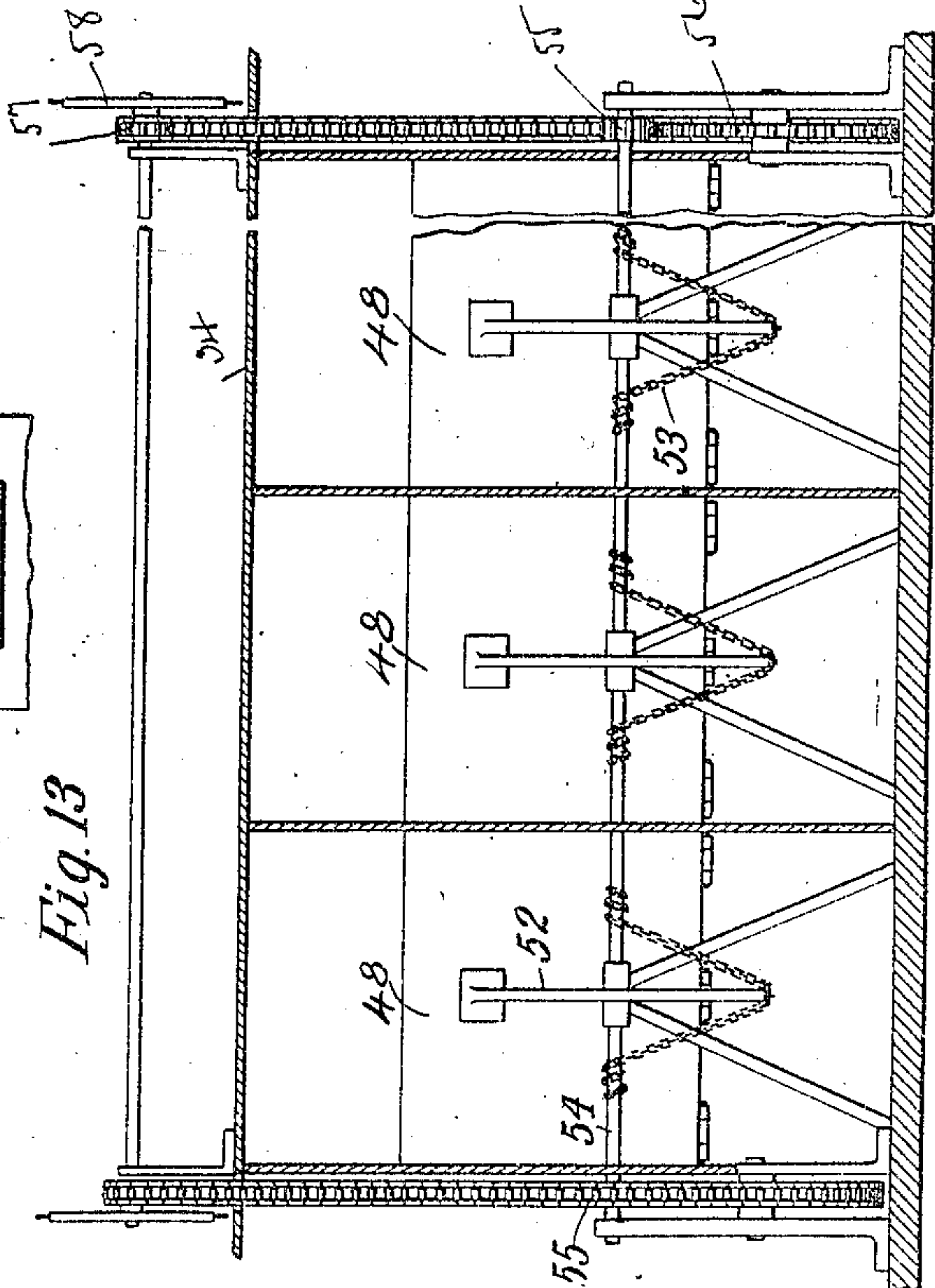


Fig. 13

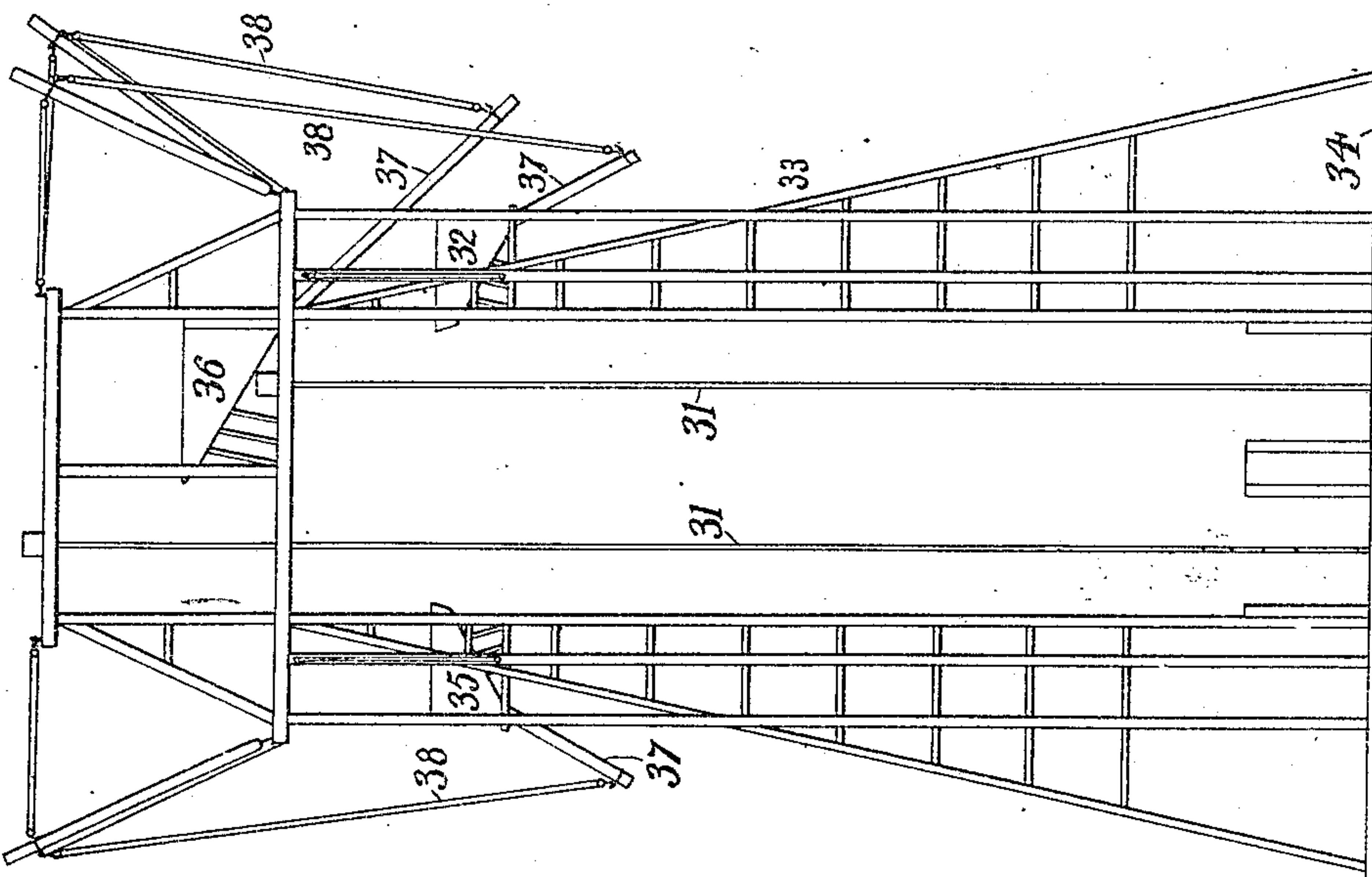


Fig. 11

Witnesses:

Thos. J. Byrnes  
S. S. Dunham

Michael S. Iverson, Inventor

by Kerr, Page & Cooper Attys.



# UNITED STATES PATENT OFFICE.

MICHAEL S. IVERSON, OF NEW YORK, N. Y.

## FLOATING ELEVATOR OR LIGHTER.

No. 812,206.

Specification of Letters Patent.

Patented Feb. 13, 1906.

Application filed March 14, 1904. Serial No. 197,918.

*To all whom it may concern:*

Be it known that I, MICHAEL S. IVERSON, a citizen of the United States, residing at New York, in the county of Kings and State of New York, have invented certain new and useful Improvements in Floating Elevators or Lighters, of which the following is a specification, reference being had to the drawings accompanying and forming part of the same.

This invention relates generally to conveyers and elevators, and particularly to floating elevators or lighters; and its object is to provide simple and efficient means for discharging a cargo of grain or other loose material.

My invention consists in certain combinations of devices, features of construction, and arrangements of parts, all as will be hereinafter set forth, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of a lighter built according to my improvements, the hull being shown in longitudinal section. Fig. 2 is a cross-section of the hull. Fig. 3 is a detail showing one form of weighing means which may be placed at the bottom of a bucket-shaft. Fig. 4 is a plan of the bins and elevator-shafts in the hold of the lighter. Fig. 5 is a side elevation of a band conveyer. Fig. 6 is a plan of a strip of flooring running along the middle portion of the lighter and beneath which the lower reach of the belt conveyer runs, said view showing independently-operable gates in the floor over the buckets of the conveyer.

Fig. 7 is a section of the lower reach of the band conveyer, showing the relative arrangement of the buckets. Fig. 8 is a section on line VIII VIII, Fig. 5. Fig. 9 is a section on line IX IX, Fig. 5. Fig. 10 is a plan view of a section of the lower reach of the band, showing one form of sprocket-chain which may be used therein. Fig. 11 is a front elevation of the superstructure of one of the elevators seen at Fig. 1. Fig. 12 is a side elevation of a gate for closing a chute that receives discharge from the upper reach of the band conveyer. Fig. 13 is a diagrammatic detail of means for tilting a floor-leaf provided in a bin, whereby the grain may be shifted toward the conveyer.

In the several views like parts are identified by like signs.

At Fig. 5 is illustrated the preferred form of a band conveyer, which comprises an endless chain 1, a pair of wheels 2 3, over which the chain runs, the former being an idle wheel

and the latter having sprockets 4 to drive the chain and buckets 5, connected to the chain. The band comprises an upper reach 6 and a lower reach 7. In the latter the buckets are in normal condition, or open at the top, to receive the grain or material to be conveyed, while in traveling up over the wheel 2 the buckets become inverted, and hence capable of discharging their contents. The lower reach of the conveyer runs upon rolls 8, suitably mounted upon the bottom of floor 9 of the lighter, and overlying said lower reach is an upper strip of flooring 10, extending longitudinally of the lighter and at about its middle portion, said strip 10 cooperating with the rollers 8 to guide the lower reach 7, thereby preventing the buckets from shaking out their contents. The grain carried in the lighter discharges through apertures 11, formed in said strip, into the buckets 5 in the lower reach. To prevent spilling the material from the buckets after they are filled and before the point of discharge is reached, an endless belt 12 runs over the wheel 2 and directly in contact with the wheel-rim, thus occupying a position between the buckets and the wheel, so as to close the mouths of the former. The belt is sufficiently narrow to lie between the inner links 13, Fig. 5, of the chain 1, completely covering the buckets, so that the contents thereof cannot escape. From the top of the wheel 2 the belt 12 runs partly along the upper reach 6 of the band conveyer and in contact with the buckets, still keeping them closed, as at 14, Fig. 5, and at a point about midway between the wheels 2 and 3 the belt runs down around an idle pulley 15, and thence directly back and finally down over an idle pulley 16 to the wheel 2. Beneath the return portion of the belt is a guard or partition 17, which closes in the belt and wheel and pulleys. The wheel 3 is also protected by a curved partition 18, which is extended horizontally at 19 beneath a portion of the upper reach 6, said partitions forming walls of a general protective casing in which the several portions of the conveyer work. The idle pulley 15 extends within a vertical chute 20, standing upon the floor 10 below the upper reach 6 of the conveyer, so that when the bucket-covering belt 12 separates from the buckets the latter discharge directly into said chute, whence they proceed to the sprocket-wheel 3 and thence down to the lower reach 7 to become refilled. Upon both sides of said chute the upper reach is sup-



ported by suitable rolls 21, located above the partitions 17 and 19, and a guard or partition 22 overlies the upper reach and extends down around the wheels 2 3, as at 23, to the floor 9 of the lighter. The overlying strip 22 may be flush with or form part of the deck of the lighter. The chute or well 20 is provided at each side with a spout or discharge 23, having a gate 24, which may be lifted by a link 25, Fig. 12, and lever 26. Buckets 27 receive the discharges from said spouts and preferably rest upon platforms 28 of scales 29, Fig. 3, whereby the weight of the contents of each bucket may be ascertained. Said platforms are at the lower portions of shafts 30; one at each side of the band conveyer already described, and may be hoisted up said shafts by means of ropes 31, connected to any suitable winding means.

One of the hoisting-buckets may dump into a chute 32, shown near the top of a superstructure 33, rising from the deck 34 of the lighter, while the other bucket may dump either into a chute 35 upon the other side of the superstructure or else may be hoisted farther and dumped into a chute 36, which is supported above the chute 32 and on the same side of the lighter. Hence the lighter may discharge from both sides simultaneously or may discharge all at one side, as may be required. Each dumping-chute is provided with a movable spout 37, adjustable to different angles by means of tackle 38.

At Fig. 2 it will be seen that flooring 39 slopes upwardly from the middle strip 10 to the sides 40 of the lighter, so as to direct the material in the hold or bin toward said middle strip. The flooring 39 may be supported by means of timbers 41, resting upon the bottom 9 of the lighter. The apertures 11 in said strip 10 are closed by gates 42, each gate having a rack 43, with which meshes a pinion 44, carried by the lower end of a vertical shaft 45, whose upper end is provided with a hand-wheel 46 above the deck 34 of the lighter, whereby any gate may be opened or closed conveniently and independently of the other gates. As seen at Fig. 4, the hold may be divided on each side by a series of partitions 47, which are a convenience in connection with the gates 42 in keeping the lighter in proper trim as well as being otherwise desirable.

Upon the floor of each bin or compartment lies a leaf 48, Figs. 2 and 13, hinged at its lower edge at 49, so that it may be tilted up to urge or shift the material toward the band conveyer. The upper edge of the leaf lies normally under a hinged flap 50, which prevents material from dropping into the bilge, said flap being caught by a latch 51 when it is lifted by the leaf. The latter is operable by means of a series of arms 52 depending from its under side and connected by a chain or chains 53 to a shaft-like windlass 54, the

chain being preferably continuous and winding upon the shaft between the arms, as shown at Fig. 13. The shaft may be rotated by means of a pinion 55 thereon, which meshes with a sprocket or gear wheel 56, the latter being connected by a sprocket-chain to a sprocket-pinion 57, having a hand-wheel 58 and mounted above the deck 34 of the lighter. As seen at Fig. 13, the shaft-operating mechanism may be duplicated at the ends of the shaft for convenience. Preferably there is one leaf in each of the compartments formed by the partitions 47 in the hold.

Referring to Figs. 1 and 4, it will be seen that the lighter is provided with two of the described band conveyers, each having a pair of wheels, and the wheels 2 in each pair being mounted concentrically or upon the same shaft 59 midway of the lighter. Each of the band conveyers is provided with a chute 20, hoisting-buckets, &c., whereby the cargo may be discharged fore and aft simultaneously, which is an advantage.

Having thus described my invention, I claim—

1. A band conveyer comprising a series of buckets, the band having upper and lower reaches, and the buckets being so attached that they are inverted while in the upper reach, a wheel over which said band runs upwardly, and a belt running upon said wheel and partly along the upper reach of said band, and covering the mouths of the buckets while running up over said wheel and after they leave the wheel.

2. A band conveyer comprising a sprocket-chain, a series of buckets attached thereto, the band having upper and lower reaches, and the buckets being so attached that they are inverted while in the upper reach, a sprocket-wheel for driving the band, a wheel over which said bands run upwardly, a belt running upon the last-mentioned wheel, an idle pulley for said belt between said wheels and immediately beneath the upper reach of said band, rolls supporting both the lower and upper reaches of said band and also the reach of said belt between said idle pulley and said upwardly-running band-wheel, and guards for cooperation with said rolls, said guards extending along said reaches in contiguity with the upper sides thereof.

3. A band conveyer comprising a sprocket-chain, a series of buckets attached at their open ends to said chain, the band having upper and lower reaches, wheels whereon the band runs, including a sprocket-wheel and an idle wheel over which the band runs upwardly, a bucket-closing belt running over said idle wheel and partly along the upper reach, rolls supporting both said belt and the upper and lower reaches of said band, a fixed guide for the lower reach of the band between said band-wheels, and a fixed guard overlying the upper reach of the band and curving



around said band-wheels to the lower side thereof.

4. In combination, a band conveyer comprising a series of buckets and having a lower reach in which the buckets are supported in normal condition and an upper reach in which the buckets are inverted, means for driving the band, a bin having provision whereby it may discharge into the buckets of the lower reach, means for covering the mouths of the buckets while they travel from the lower to the upper reach and partly along the upper reach, and means for receiving the discharge from the buckets in the upper reach.

5. In combination, a band conveyer comprising a series of buckets and having a lower reach in which the buckets are supported in normal condition and an upper reach in which the buckets are inverted, wheels for operating the band, a bin having a floor interposed between the reaches and located closely adjacent to the lower reach, said floor being provided with a discharging-aperture above said lower reach, a belt traveling over one of the operating-wheels and covering the mouths of the loaded buckets while they travel to the upper reach, and means for receiving the discharge from the buckets in the upper reach.

6. In combination, a band conveyer comprising a series of buckets and having a lower reach in which the buckets are supported in normal condition and an upper reach in which the buckets are inverted, wheels for operating the band, a bin having a floor beneath which said lower reach travels, said bin being divided into a series of compartments, and said floor being provided with a series of gates overlying said lower reach, means for opening any gate independently of the others, a belt traveling over one of said wheels and covering the mouths of the loaded buckets while they travel upwardly and partly along the upper reach, and means for receiving the discharge from the buckets in the upper reach.

7. In combination, a band conveyer having upper and lower reaches, a bin having a sloping floor beneath the lower portion of which said lower reach travels and also having means for discharging into said lower reach, a hinged floor-leaf provided with a set of lifting-arms, a shaft extending along said leaf, chain connections from said shaft to said arms, whereby the winding of the chain on the shaft lifts the arms and leaf, a pinion upon said shaft, a gear meshing with said pinion, a sprocket-chain connected to said gear, and a hand-wheel having a sprocket-pinion over which said chain runs.

8. An elevator comprising a band conveyer provided with buckets and having a lower reach in which the buckets are supported in normal condition and an upper reach in which the buckets are inverted, means for discharging into the buckets in the lower

reach, a belt for covering the mouths of the loaded buckets as they travel to and partly along the upper reach, a chute beneath said upper reach for receiving the discharge from the buckets, a bucket into which said chute discharges, and means for hoisting said bucket.

9. An elevator comprising a band conveyer provided with buckets and having a lower reach in which the buckets are supported in normal condition and an upper reach in which the buckets are inverted, a bin having means for discharging into the buckets in the lower reach, a belt for covering the mouths of the loaded buckets as they travel to and partly along the upper reach; a chute beneath the buckets in the upper reach at the end of said belt and provided with spouts upon its opposite sides, and gates for the spouts.

10. An elevator comprising a band conveyer provided with buckets and having a lower reach in which the buckets are supported in normal condition and an upper reach in which the buckets are inverted, wheels whereon the band runs, a bin having a floor above said lower reach and provided with means for discharging into said lower reach, a belt running over one of said wheels and covering the mouths of the loaded buckets, an idle pulley under said upper reach, whereon said belt runs, a chute beneath said upper reach at said idle pulley, and a spout or discharge for said chute at one side of said band conveyer.

11. An elevator comprising a band conveyer provided with buckets and having a lower reach in which the buckets are supported in normal condition and an upper reach in which the buckets are inverted, means for closing the filled buckets while they move to and along the upper reach, a bin discharging into the lower reach, a chute beneath said upper reach, spouts for said chute at the sides of said conveyer, gates for said spouts, shafts into which said spouts open, buckets into which said spouts discharge, and means for hoisting the last-mentioned buckets up said shafts.

12. The combination of a band conveyer provided with buckets and having a lower reach in which the buckets are supported in normal condition and an upper reach in which the buckets are inverted, a bin discharging into the lower reach, means for closing the filled buckets as they move to the upper reach, a chute beneath said upper reach, a spout for said chute at the side of said conveyer, a bucket into which said spout discharges, and means for weighing and hoisting the filled bucket.

13. An elevator comprising a band conveyer provided with buckets and having a lower reach in which the buckets are supported in normal condition and an upper reach in which the buckets are inverted, means for closing the buckets as they move upwardly and along the upper reach, a chute beneath



the upper reach, spouts for said chute at the sides of said conveyer, shafts into which said spouts open, buckets into which said spouts discharge, means for hoisting said buckets up  
 5 said shafts, a dumping-chute upon one side of the elevator for one of said shaft-buckets, and two dumping-chutes one above the other upon the other side of said elevator, one for each of said shaft-buckets.

10 14. An elevator comprising a plurality of band conveyers each provided with buckets and each having an upper reach and a lower reach, bins having means for discharging into the lower reaches, chutes beneath the upper  
 15 reaches, and hoisting-buckets into which the chutes discharge.

15 15. An elevator comprising a plurality of band conveyers each provided with buckets and each having an upper reach in which the  
 20 buckets are inverted and a lower reach in which the buckets are in normal condition, bins having floors sloping upwardly from both sides of the lower reaches and having means for discharging into the lower reaches, belts  
 25 for closing the filled buckets as they move up and along the upper reaches, chutes beneath the upper reaches and each having discharges upon opposite sides, buckets for receiving the discharges from said chutes, means for  
 30 hoisting said receiving-buckets, and dumping-chutes for said receiving-buckets.

16. An elevator comprising two adjoining band conveyers, each being provided with  
 35 buckets and having a lower reach in which the buckets are in normal condition and an upper reach in which the buckets are inverted, a pair of wheels over which each band runs, a wheel in one pair being mounted side by side with a wheel in the other pair, belts  
 40 closing the mouths of the buckets as they move up and along the upper reaches and chutes beneath said upper reaches.

17. A lighter having bins whose flooring slopes downwardly from the sides toward the  
 45 center of the vessel, partitions dividing said bins into compartments, gates in the flooring along the middle of the vessel, means for opening said gates independently of one another, two adjoining band conveyers, each  
 50 conveyer being provided with buckets and

having a lower reach in which the buckets are in normal condition and an upper reach in which the buckets are inverted, said lower reaches running beneath said gates, a pair of  
 55 wheels over which each band runs, a wheel in one pair being mounted side by side with a wheel in the other pair, belts closing the mouths of the filled buckets as they move up and along the upper reaches, chutes beneath the upper reaches, shafts at the sides of each  
 60 chute, buckets in the shafts into which the chutes discharge, means for hoisting the buckets, and dumping-chutes for the buckets.

18. A lighter having a deck and a bottom, a band conveyer provided with buckets and  
 65 comprising a lower reach running along said bottom and an upper reach running along the upper side of said deck, wheels over which the buckets run, flooring immediately overlying said lower reach and sloping upwardly  
 70 therefrom to the sides of the lighter, partitions dividing the space between said deck and said flooring-apertures in the flooring above the buckets in said lower reach, gates for closing the apertures, a belt closing the  
 75 mouths of the buckets as they pass from the lower to the upper reach, a chute at the termination of said belt and below said upper reach, a discharge for said chute, and means for hoisting the material discharged from the  
 80 chute.

19. A lighter having bins arranged about a well, a conveyer to carry material from the bins to the well, and means for hoisting the material and discharging the same, compris-  
 85 ing a superstructure or elevator above the well, a pair of buckets receiving material from the conveyer, means for hoisting the buckets, a chute for each bucket to receive the material therefrom, said chutes being arranged to  
 90 discharge on opposite sides of the lighter, a third chute arranged above one of the others, discharging on the same side, and extending across the superstructure or elevator to receive material from the other bucket, as set  
 95 forth.

MICHAEL S. IVERSON

Witnesses:

M. LAWSON DYER,  
 S. S. DUNHAM