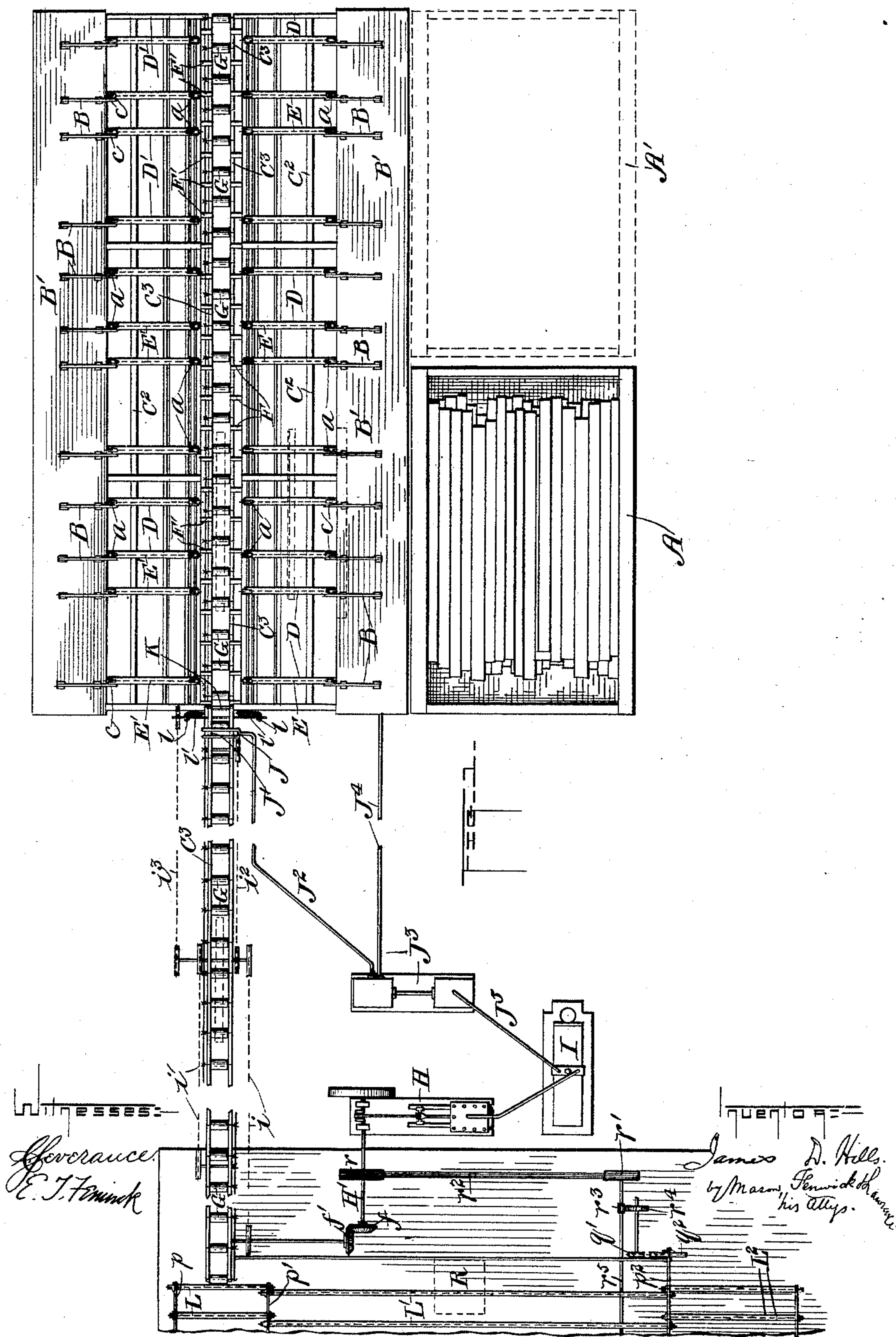


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LUMBER PULLING, WASHING, AND ASSORTING MACHINE.

Patented Nov. 8, 1892.



(No Model.)

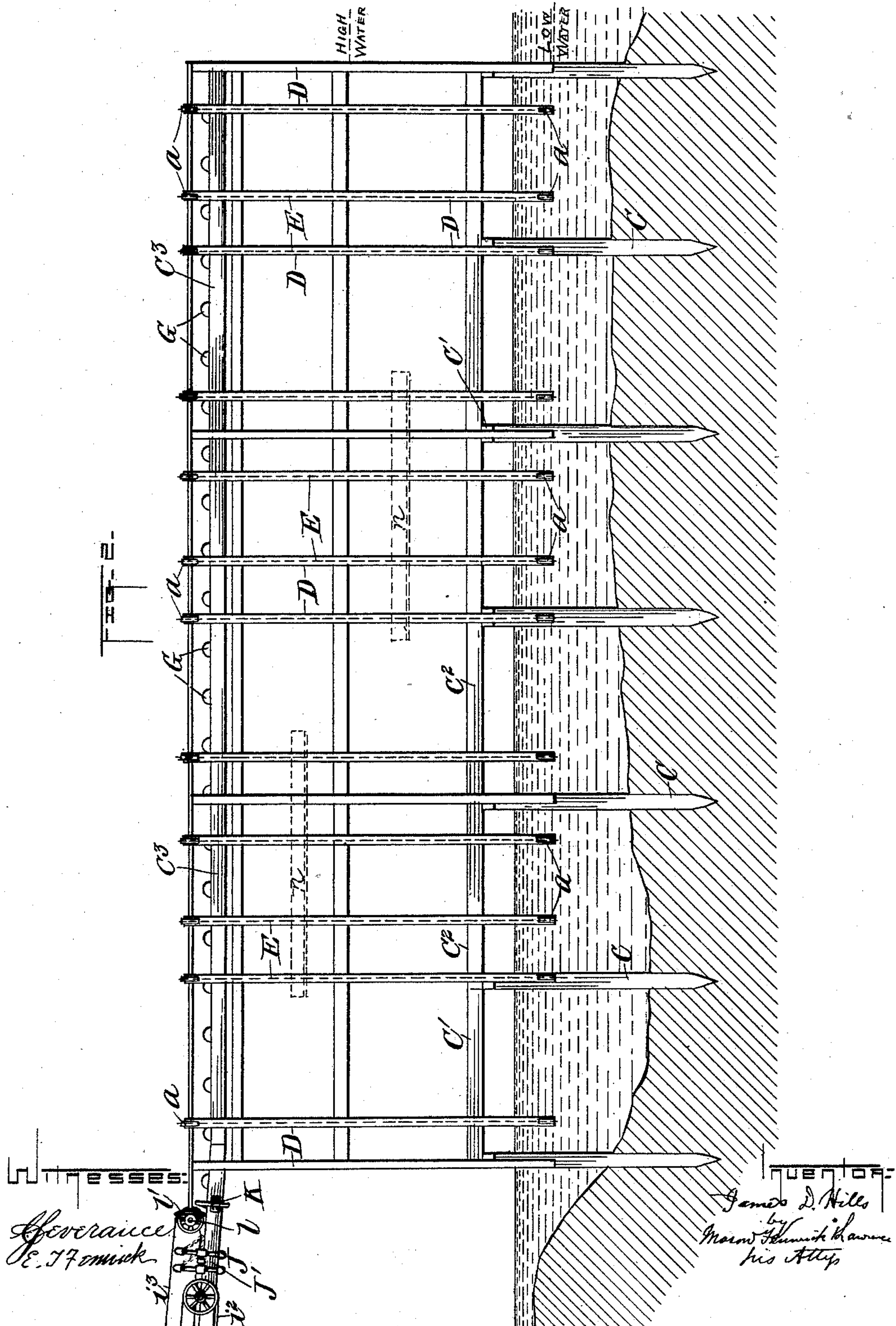
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J. D. HILLS.

LUMBER PULLING, WASHING, AND ASSORTING MACHINE.

No. 485,936.

Patented Nov. 8, 1892.



(No Model.)

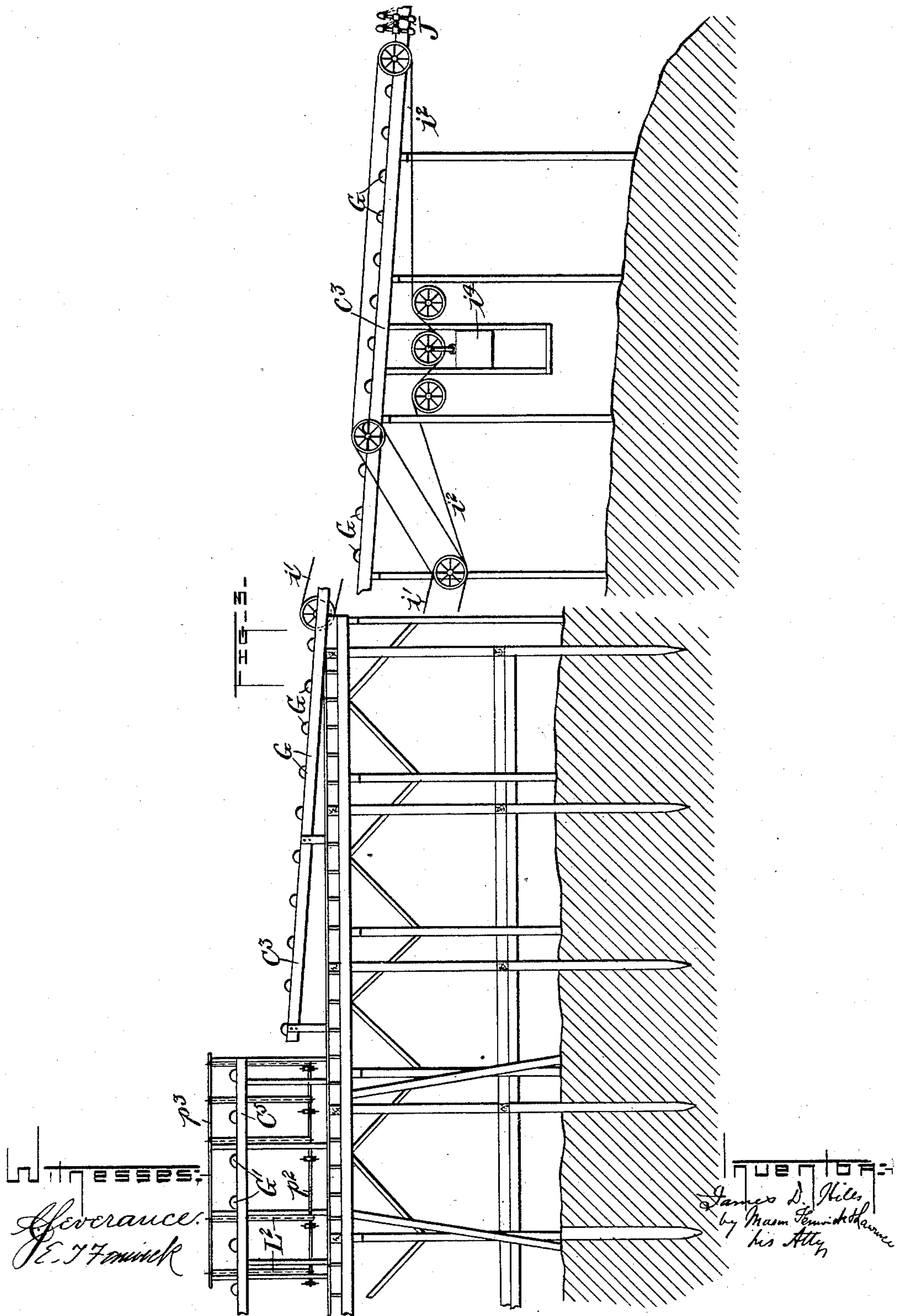
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Patented Nov. 8, 1892.



(No Model.)

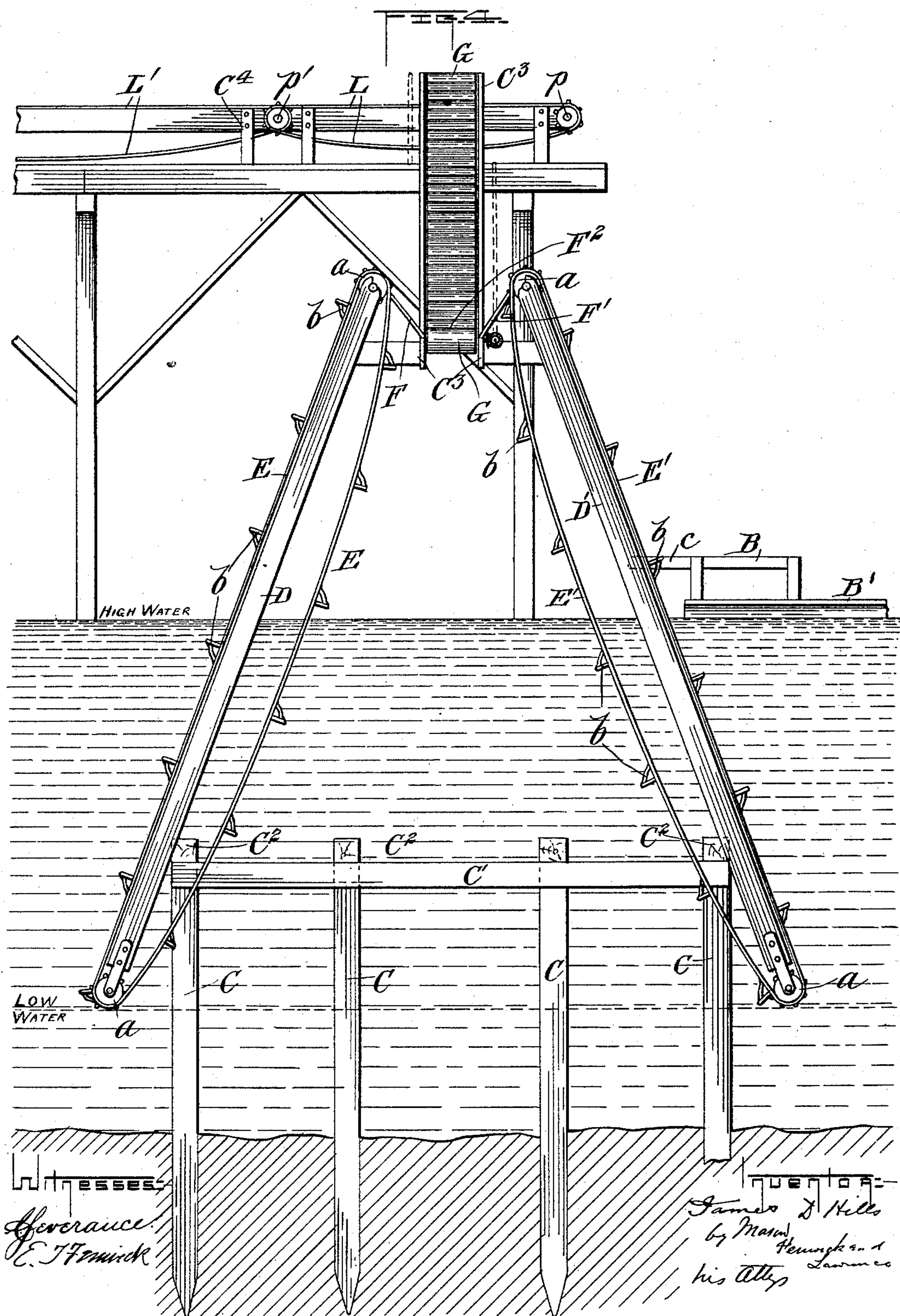
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J. D. HILLS.

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(No Model.)

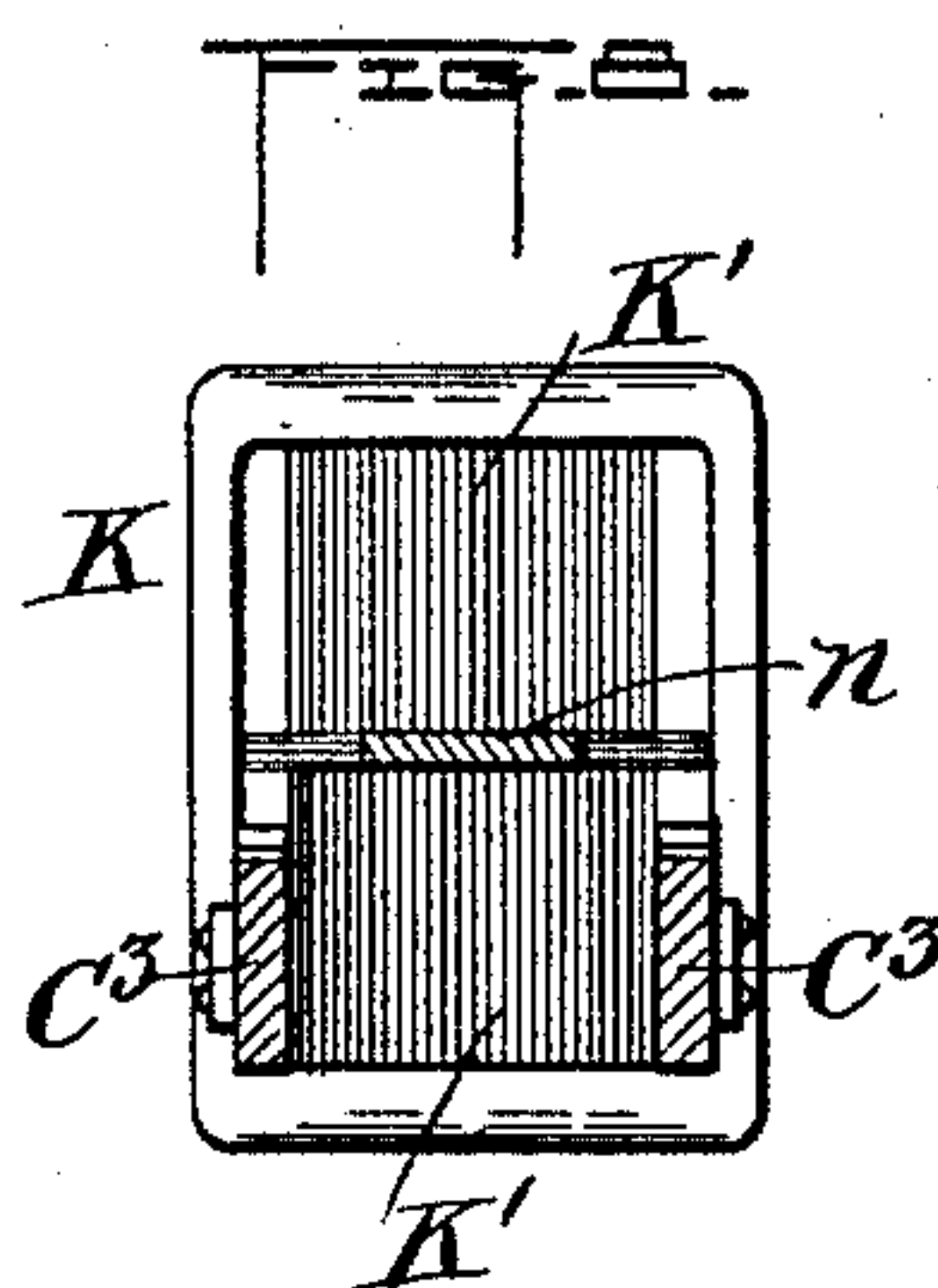
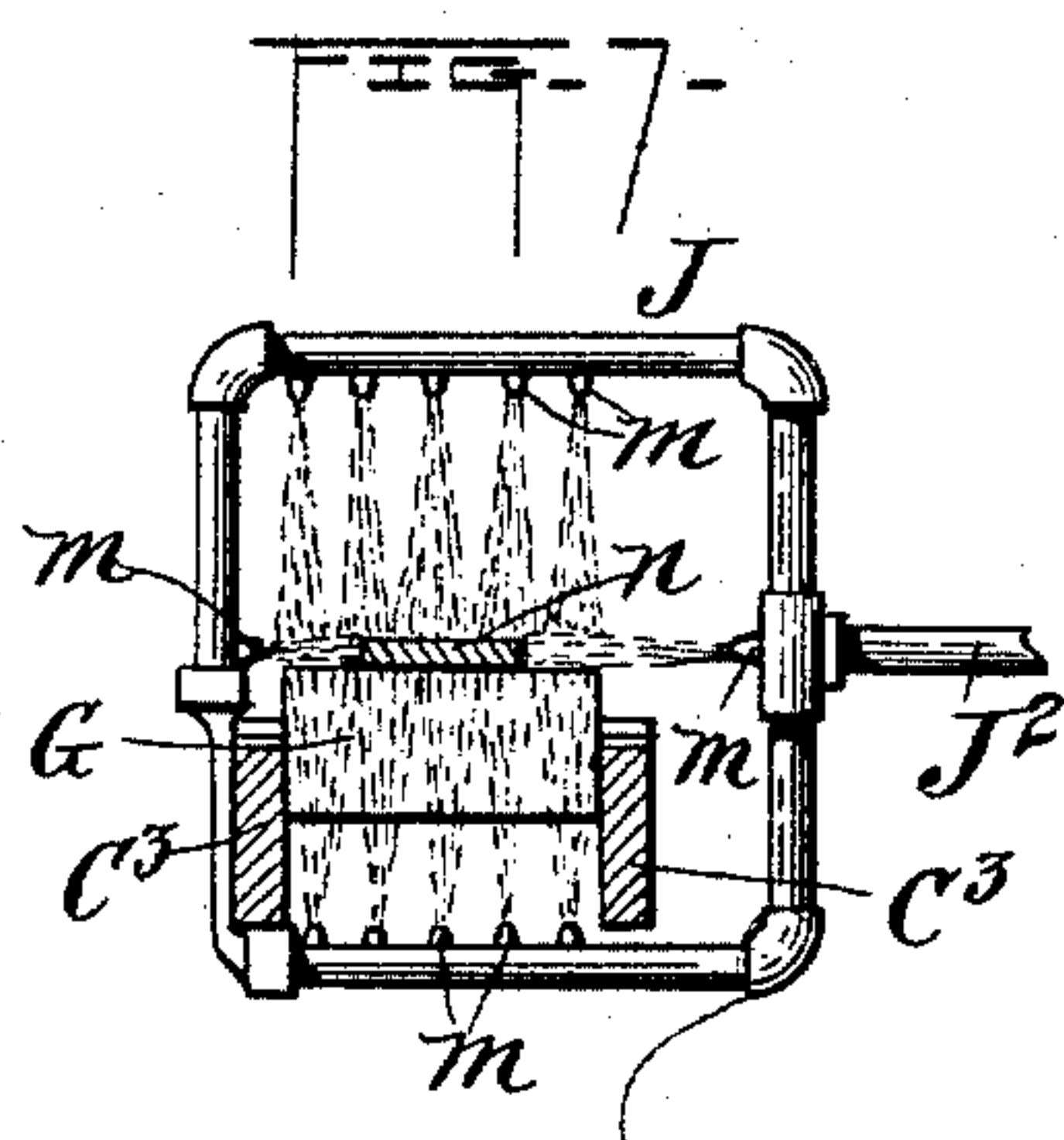
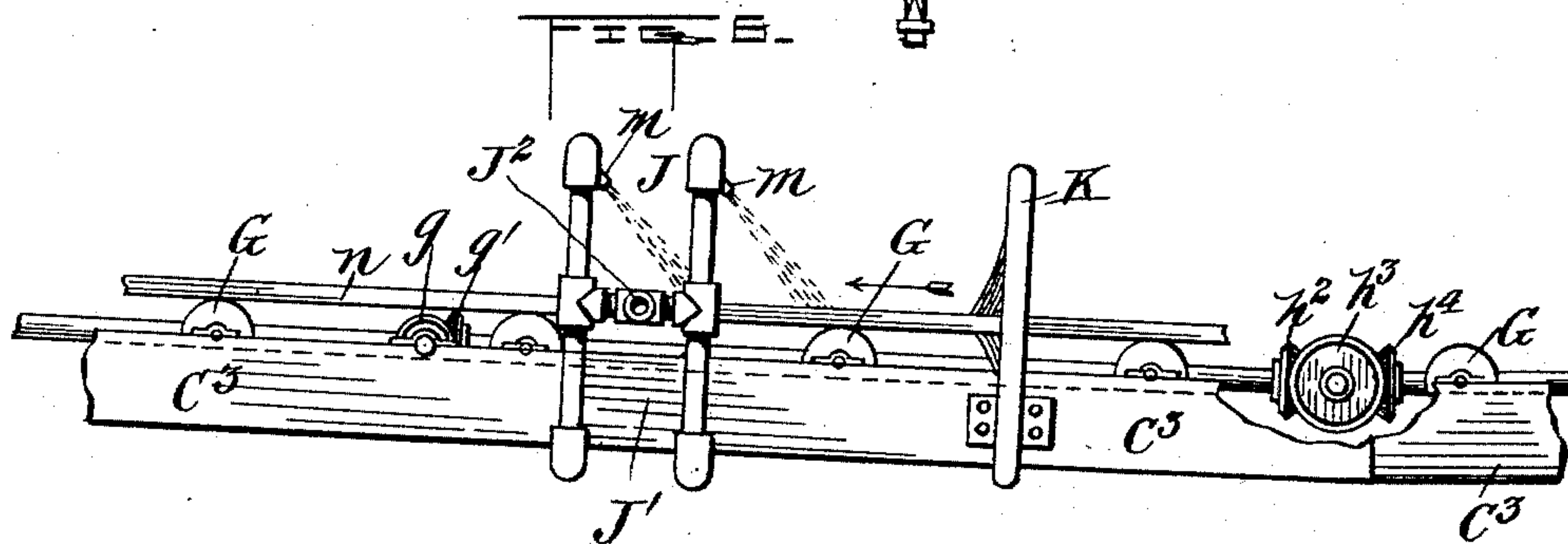
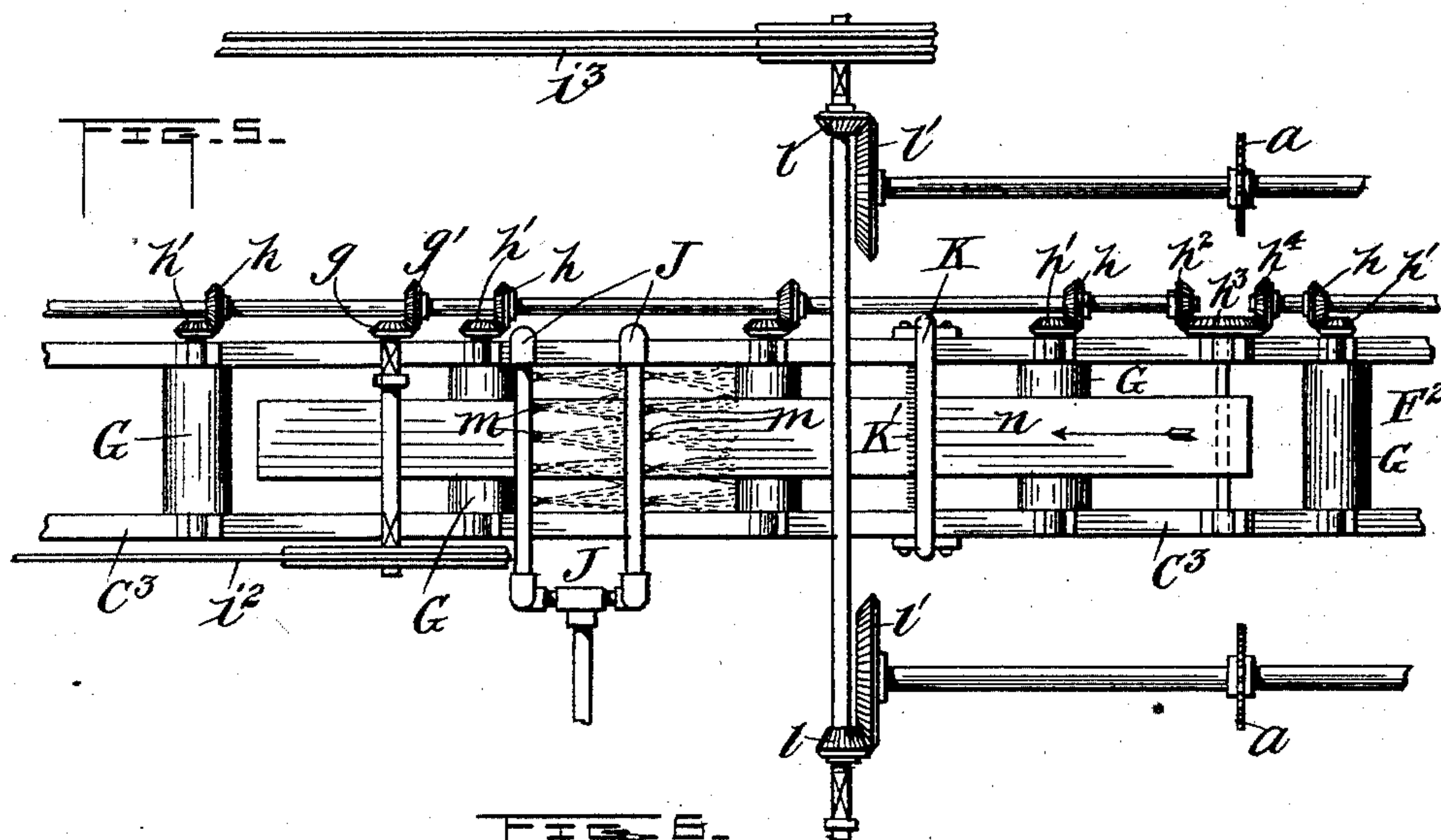
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Patented Nov. 8, 1892.



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 E. J. Fennick

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James D. Hells
by Marm, Fenwick & Lawrence
his Atty.

(No Model.)

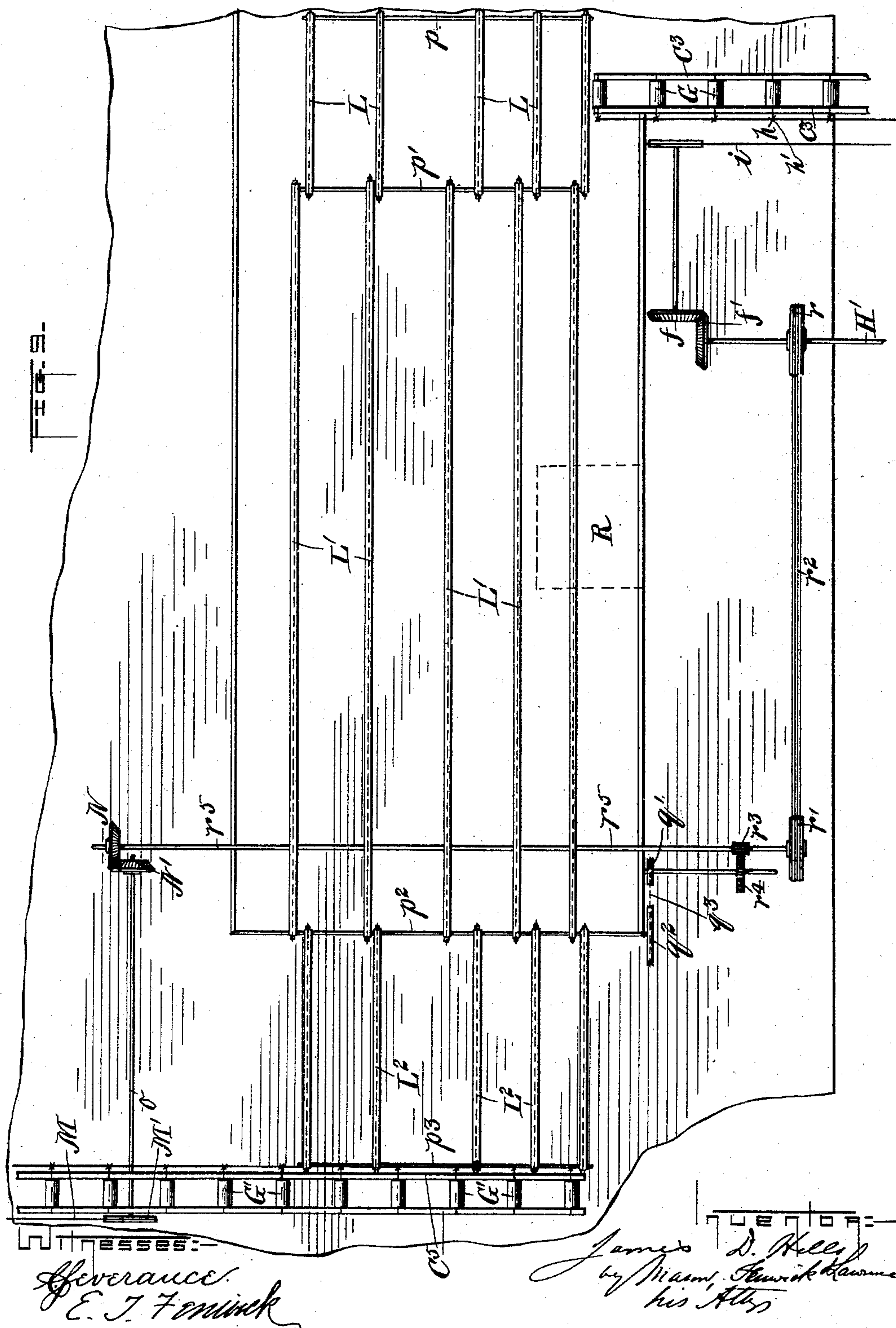
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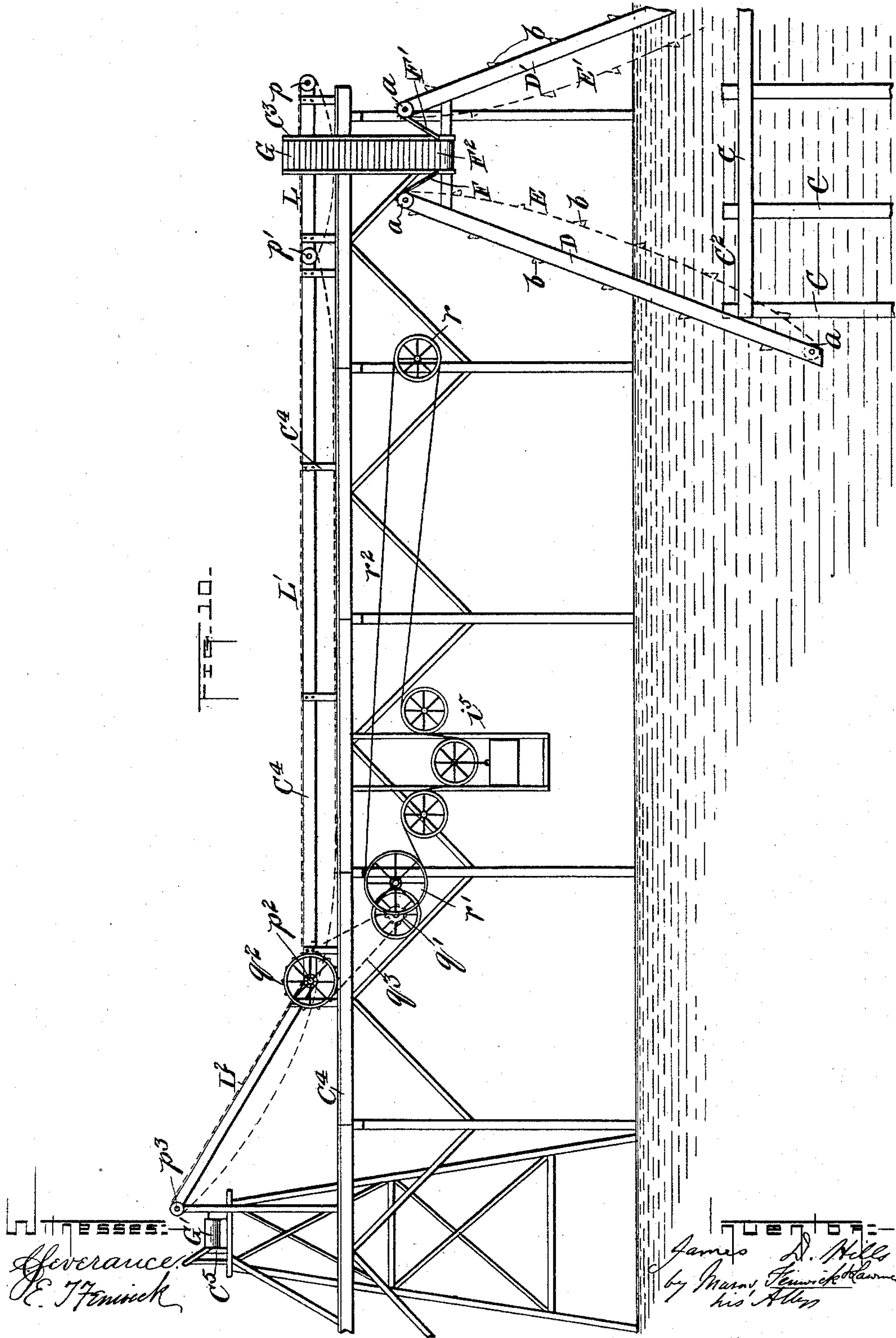
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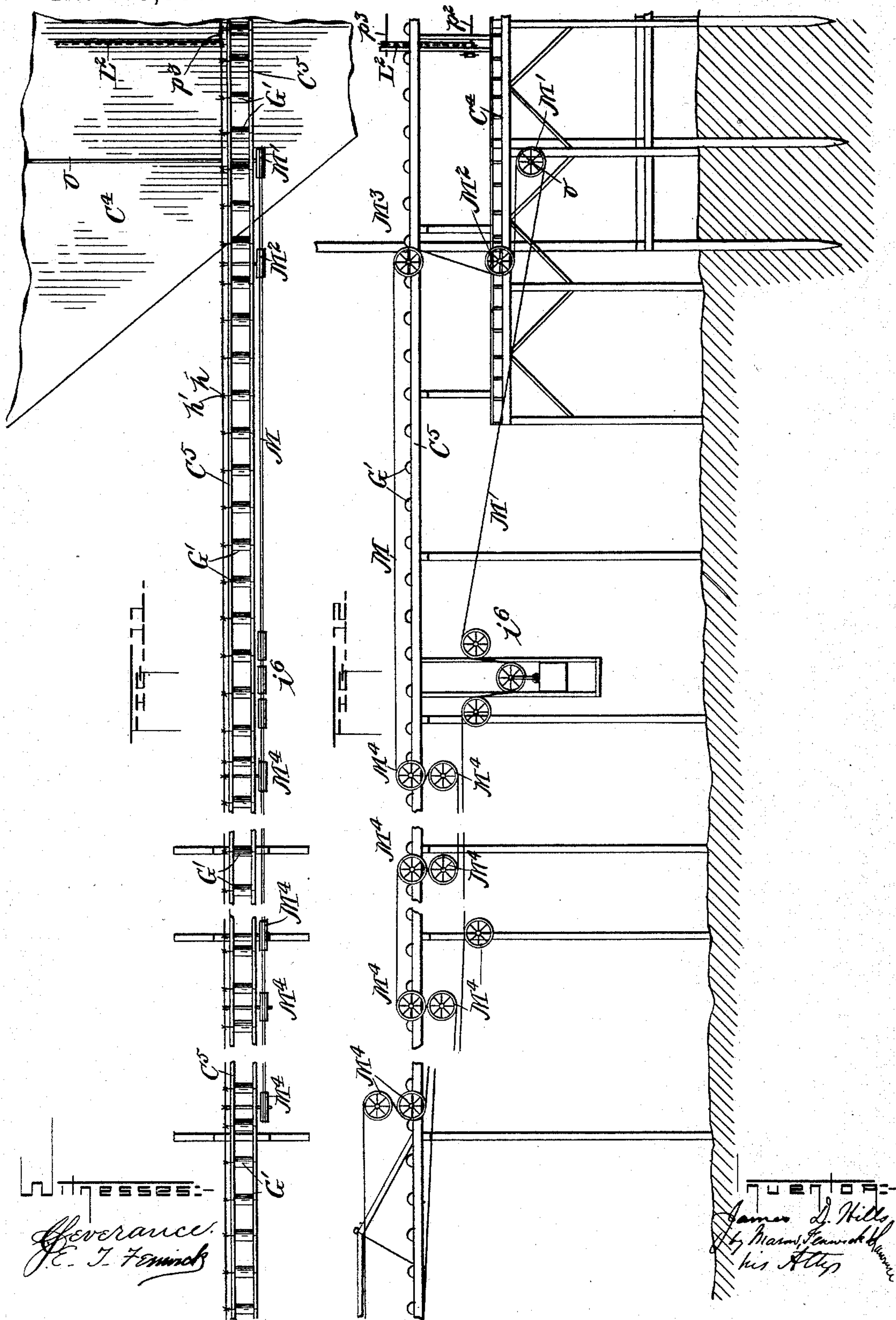
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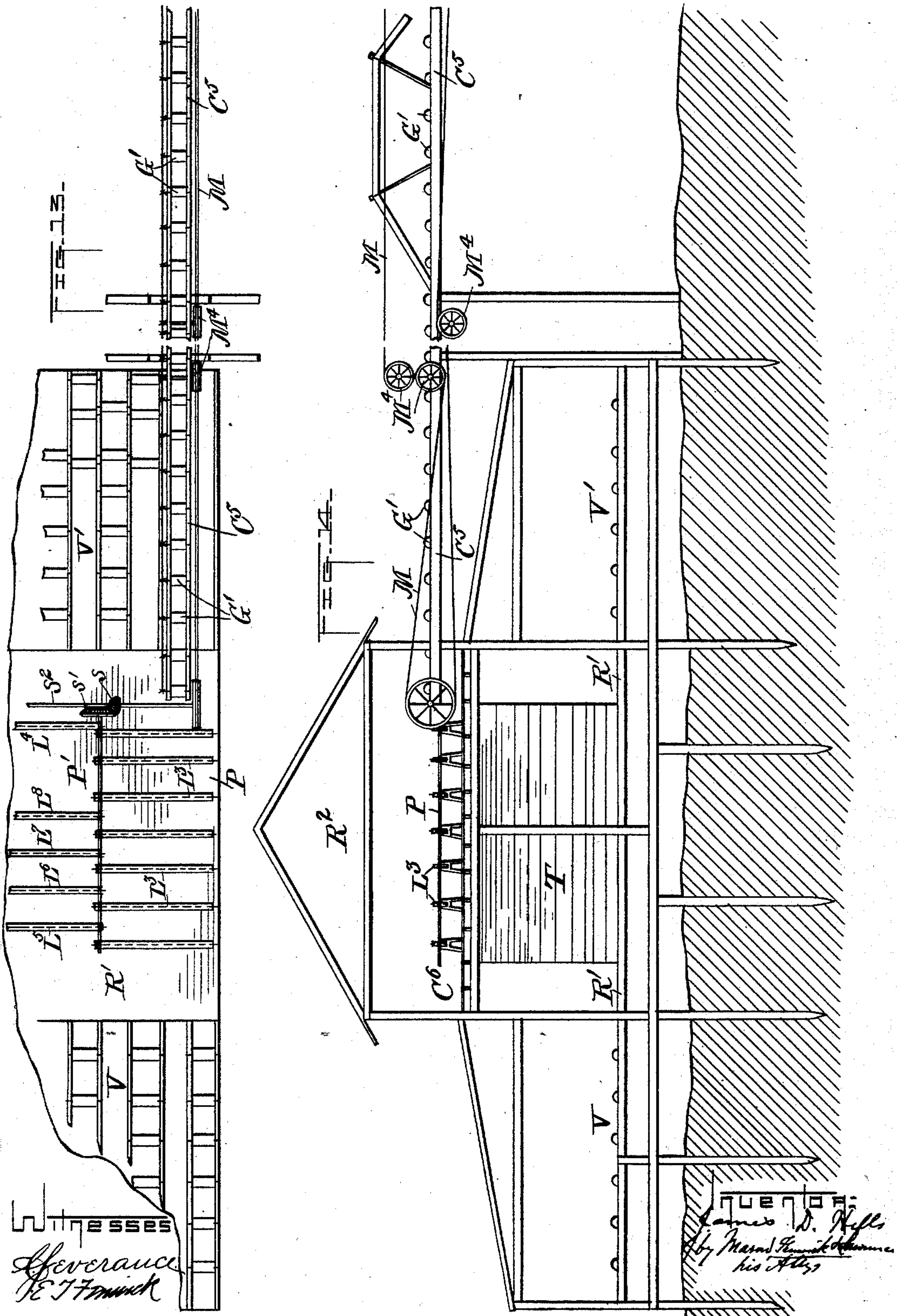


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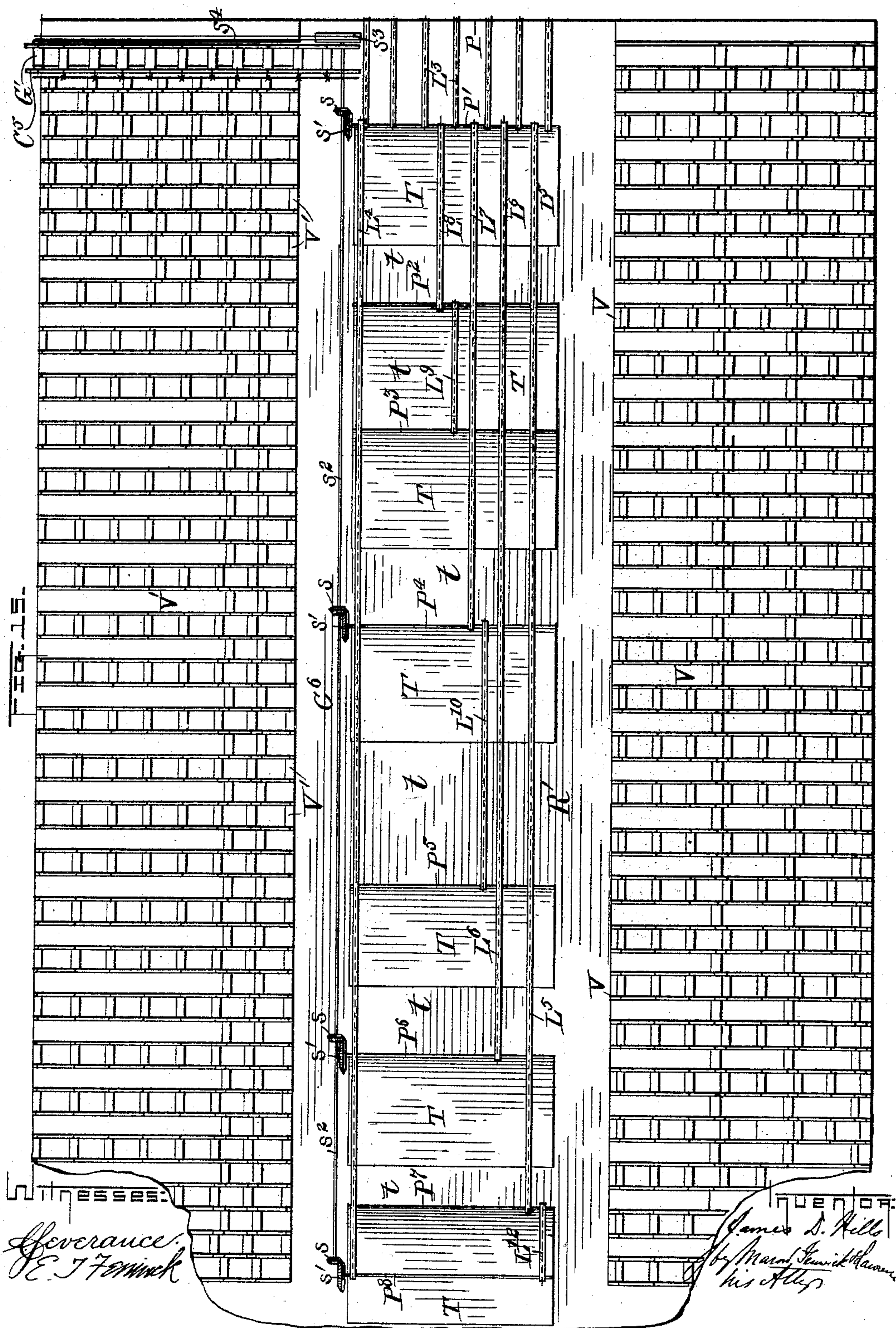
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J. D. HILLS.

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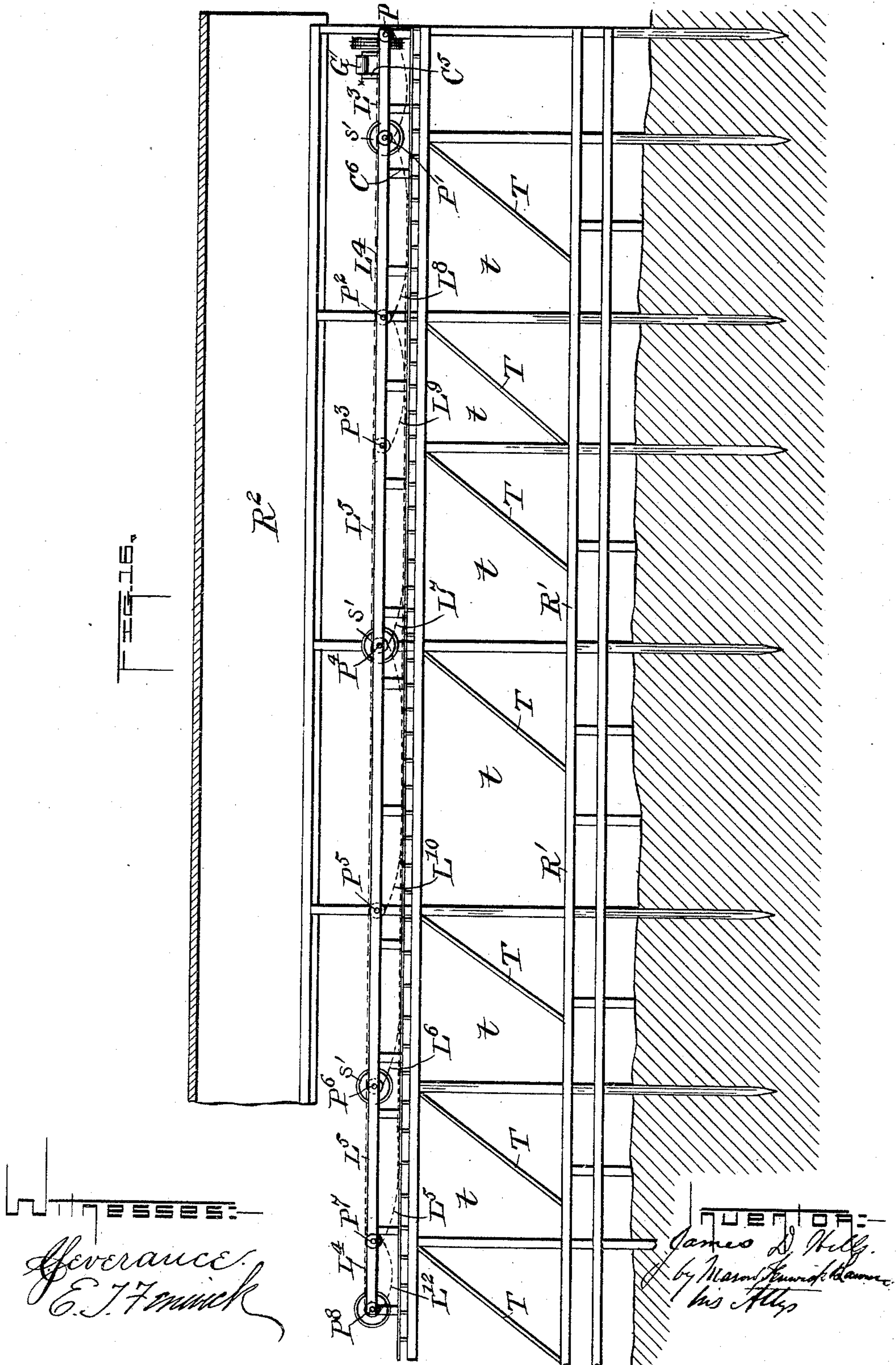
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No. 485,936.

Patented Nov. 8, 1892.



(No Model.)

12 Sheets—Sheet 12.

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FIG. 17-

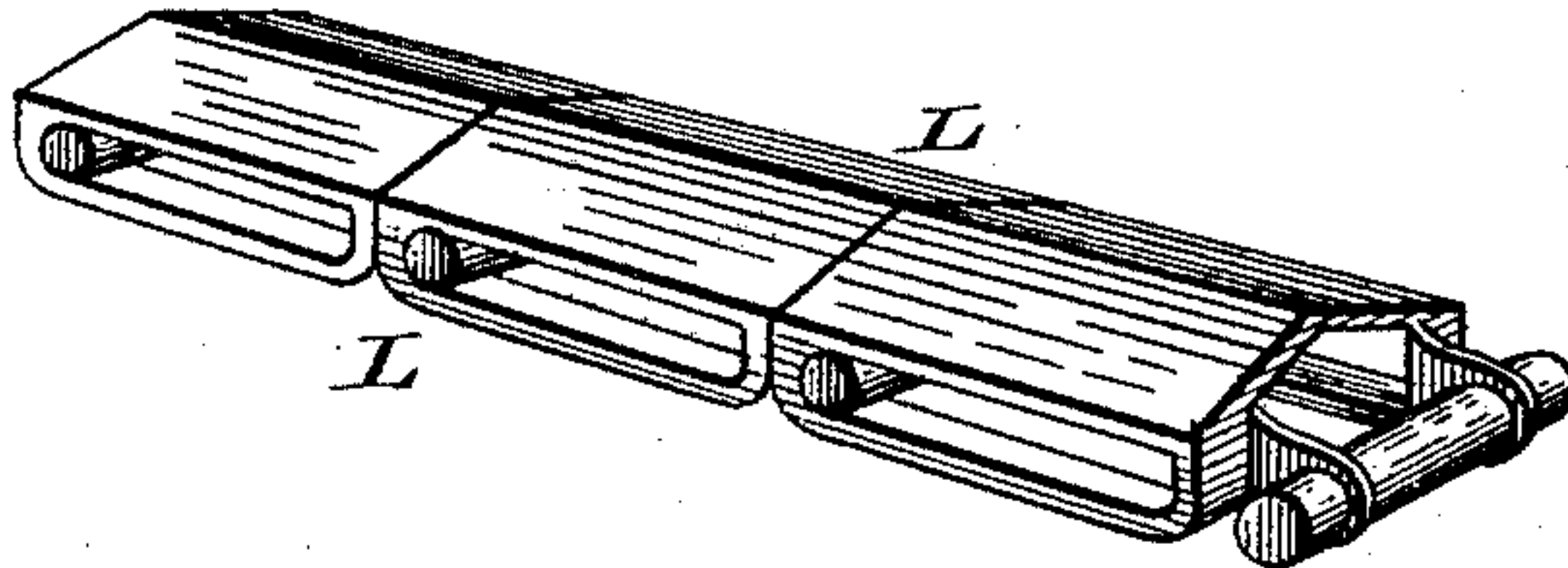


FIG. 18-

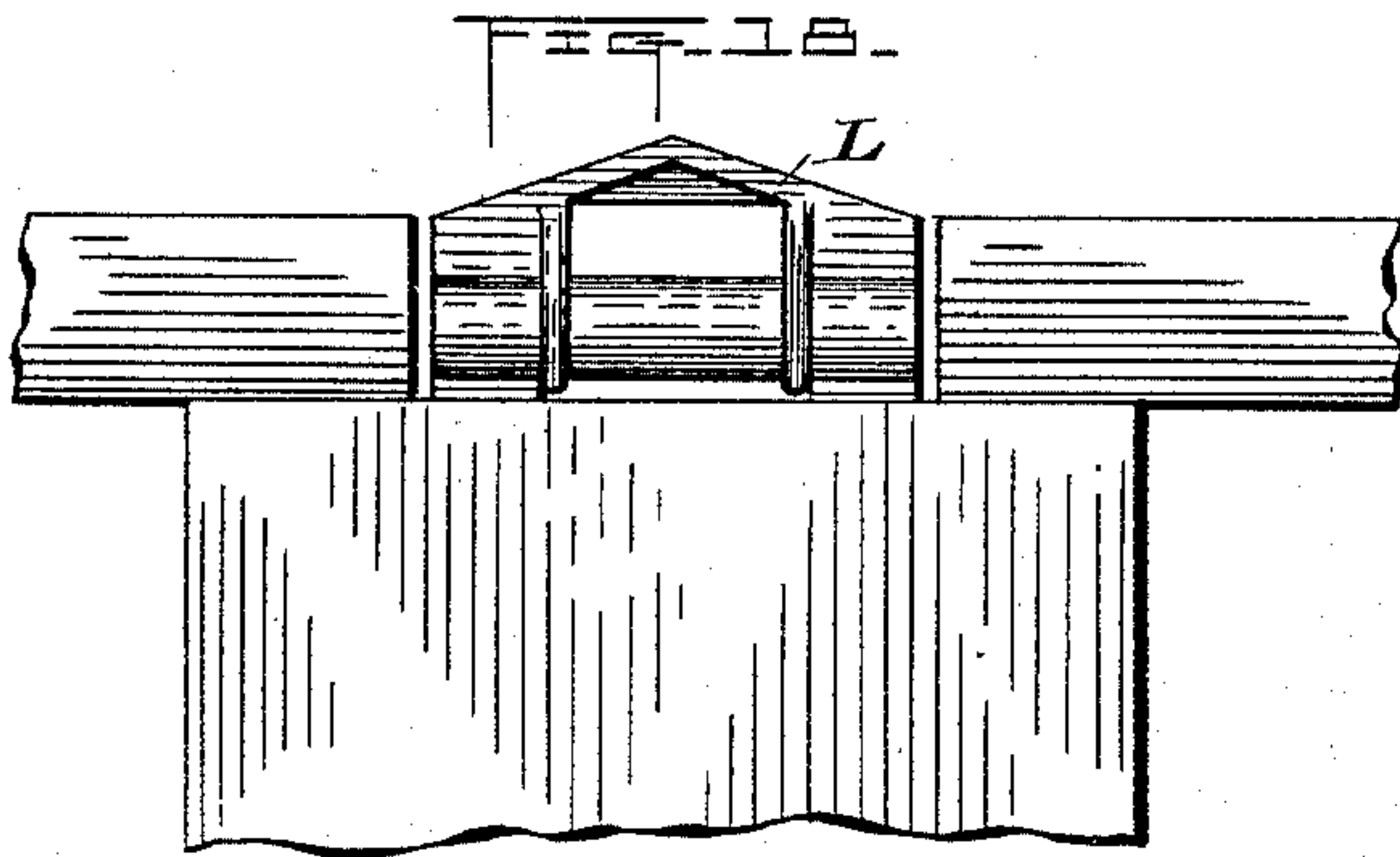
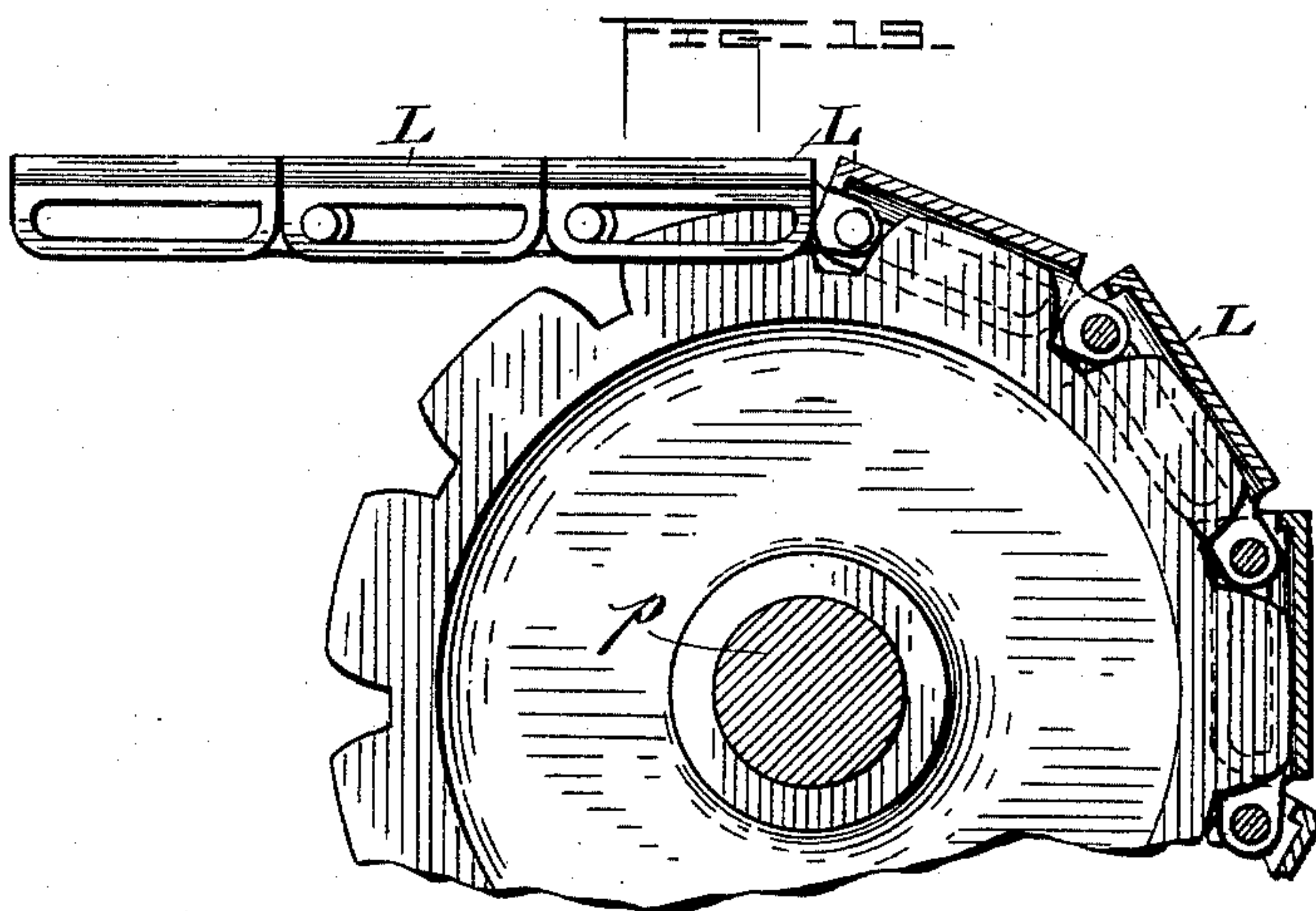


FIG. 19-



WITNESSES:-

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C. Hines.

INVENTOR:-

James D. Hills
by his Attorneys
Mason Fenwick Lawrence

UNITED STATES PATENT OFFICE.

JAMES D. HILLS, OF MENOMONEE, WISCONSIN.

LUMBER PULLING, WASHING, AND ASSORTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 485,936, dated November 8, 1892.

Application filed January 20, 1892. Serial No. 418,682. (No model.)

To all whom it may concern:

Be it known that I, JAMES D. HILLS, a citizen of the United States, residing at Menomonee, in the county of Dunn and State of Wisconsin, have invented certain new and useful Improvements in Lumber Puller and Elevating, Conveying, Washing, and Grading and Assorting Machinery; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention consists of certain novel combinations of machinery for elevating separate pieces of lumber from rafts on rivers and streams, directing and depositing them successively upon a conveyer, conveying and automatically washing them, and grading and assorting them; and its object is to save much of the great labor and expense attending the washing of the lumber with pails of water in the hands, piling the washed lumber on platforms, loading it on wagons and hauling it long distances to the yards, dumping it upon the ground, and grading, assorting, and piling it at long distances apart in the yards.

My invention will be fully understood from the following description and accompanying drawings, in which latter—

Figure 1 is a top view of a portion of the machinery, a portion of the first conveyer between its delivery end and the washer and puller, other portions of the machinery also being shown broken away. In this view are shown the puller and elevating-chains, lumber-rafts, automatic washer-heads, scouring-brushes, engine, boiler, force-pump, some of the gearing, and a portion of the steeple and ordinary horizontal and inclined transfer-chains. Fig. 2 is a side elevation of Fig. 1 in part. Fig. 3 is a side elevation of the machinery forward of the washer, illustrating the arrangement of a belt-tension mechanism between the steeple and ordinary transfer-chains and the washer. In this view portions of the steeple transfer-chains are shown and also ordinary broad-surfaced horizontal and inclined transfer-chains, a major intermediate portion of the first conveyer being broken away. Fig. 4 is an end view of the puller and elevating-chains, a conveyer-bed, a portion of

the steeple and ordinary broad-surfaced horizontal and inclined transfer-chains, and a portion of the gearing and showing the relative arrangement of the same. Fig. 5 is a top view of the automatic washer, scouring-brush, roller-bed, a piece of timber being washed, and a portion of the gearing. Fig. 6 is a side elevation showing many of the parts represented in Fig. 5. Fig. 7 is a cross-section of the conveyer-bed and a front elevation of the automatic washer-head. Fig. 8 is a cross-section of the conveyer-bed and a front elevation of the scouring-brush. Fig. 9 is a top view of a portion of the first conveyer-bed, the steeple, transfer, and the ordinary horizontal and inclined transfer chains, and the second conveyer-bed, and a portion of the gearing connecting with the engine and shaft. Fig. 10 is a side elevation of the steeple-chains, horizontal transfer-chains, inclined transfer-chains, showing, also, an end elevation of a portion of the puller and of the second conveyer-bed and a tension mechanism. Fig. 11 is a plan view of a portion of the second conveyer and inclined chains. Fig. 12 is a side elevation of the parts shown in Fig. 11 and illustrating an extension of the mechanism shown in Fig. 3. Fig. 13 is a plan view of the end of the conveyer-bed shown in Fig. 11, and also showing a portion of the assorter. Fig. 14 is a side elevation of the same, being a continuation of Fig. 12. Fig. 15 is a plan view of the assorter and a portion of the second conveyer-bed. Fig. 16 is a side elevation of the assorter as shown in Fig. 15. Fig. 17 is a perspective view of a portion of a steeple-chain. Fig. 18 is a cross-section of the same, and Fig. 19 a longitudinal section showing a sprocket-wheel working in conjunction with the steeple-chains.

A A' in the drawings designate rafts of lumber on a river or stream; B, lumber-supporting horses mounted on floating rafts B' and adapted to stand at different altitudes, accordingly as the water-line is higher or lower; C, piles connected by frame-pieces C' and forming supporting-frames, as C², below the higher and above the lower water-line.

D D' are inclined frame-pieces connected to the frames C² and to the frame-pieces of a roller-bed conveyer-frame C³ and provided

with sprocket wheels or pulleys a —one at top and the other at bottom.

EE' are endless pullers and elevating-chains arranged around the sprocket-wheels or pulleys a and provided with supporting and carrying lugs b , which pass up between the timber extensions c of the horses and take the pieces of timber therefrom and elevate them to the top of the frame-pieces D D' and discharge them inwardly over the same.

FF' are inclined directors forming, with the rollers, an open trough F² for the pieces of lumber to fall into when they become freed from the pullers and elevating-chains.

G are rollers forming a long roller conveyer-bed, a portion of which may be inclined forward of the pullers and elevating-chains, as shown. These rollers are journaled in boxes of the frame C³, and they and the pullers and elevating-chains may be positively driven by gear-wheels $f f' g g' h h' h^2 h^3 h^4$ and by pulleys having belts or ropes $i i' i^2 i^3$ and gear and sprocket wheels, as $l l' a$, said gearing being applied on journals of the rollers and on suitable shafts supported by the frames C² C³ and inclined pieces D D' and driven by an engine H, connected with the boiler I. The belt or rope gearing between the pullers and delivery end of the first conveyer is kept under proper tension by tension-pulleys and weight, as illustrated at i^4 , for giving motion to the parts thus far described.

J is a lumber-washer comprising, as one of many constructions that may be adopted, one or two rectangular frames formed of sections of tubing or piping connected by elbows and T's, said sections of tubing or piping being provided with angularly-set jet passages or nozzles m , which discharge water toward the puller and elevating-chains and against the top, bottom, and edges of the lumber or against any portion of the surface of the lumber as deemed best. This washer is fastened upon the frame C³ forward of the puller and elevating-chains and preferably occupies a position which incloses the bed within the sections of its tubing and brings its jets beneath, above, and on each side of the pieces of lumber n , passed over the roller conveyer-bed at the point J', which I designate as the "washer section." This washer is connected by a pipe J² with a forcing-pump J³, said pump being provided with a water-induction pipe J⁴ leading from the river or stream, and also being connected by pipe J⁵ with the boiler I, which operates the steam-engine H. In rear of the washer a brush-head K, having brushes K', is placed, so as to brush off mud, sand, and grit from the top, bottom, and sides of the pieces of lumber n as they pass to the washer, and thus the labor of washing off the mass of mud and dirt is lessened and the work of cleaning and washing the lumber is more readily and perfectly done. Forward of the washer a system of steeple-chains L, forming a transfer, may be arranged at right angles to the roller-bed conveyer for delivering the washed lum-

ber either to cars or to other systems of machinery. These steeple-chains are formed of links which are of triangular form in cross-section, and they are placed on a higher plane than the horizontal portion of the first conveyer, and in order to pass the lumber to them the first conveyer-bed is inclined from the washer up to the said steeple-chains, as appears from the drawings. The beveled sides of the links of the steeple-chains allow the ends of the lumber to glide over them without any liability of their abutting abruptly against them, and the pieces of lumber are so uniformly delivered that all their rear ends lie in the same straight line on the chains, and thus are in condition for being graded by the grader, who occupies a place in a small house located at R, and after being graded or marked to be conveyed to the assorting mechanism. In conjunction with the steeple-chains other horizontal chains having flat-surfaced links L' are employed for continuing the movement of the lumber, and at the ends of these chains other chains L², also having flat-surfaced links, are arranged to travel on a steep inclination, as shown in Fig. 10. The steeple-chains L and the chains L' L² are arranged on sprocket-wheels of shafts $p p' p^2 p^3$, mounted in a frame C⁴, and are driven by sprocket-wheels $q' q^2$ and chains q^3 , said gearing being controlled by tension pulleys and weights, as indicated at i^5 . The motive power for the parts just mentioned may be derived from the engine-shaft H' through pulleys $r r'$, belt r^2 , and gear-wheels $r^3 r^4$, as illustrated in Fig. 1. The speed of the transfer-chains is relatively much slower than that of the conveyer means, in order to have the pieces of lumber to pass slow enough by the grader's stand to allow him time to properly grade or mark them. At the delivery end of the inclined chains L² is a second conveyer-bed frame C⁵, arranged at right angles to said chains and having rollers G', driven by gear-wheels $h h'$, similar to those employed in driving the rollers G of the first conveyer-bed, said gearing being arranged on suitable connecting-shafts and driven by belt or rope M and pulleys M' M² M³ M⁴ and controlled by tension-pulleys and weights, as indicated at i^6 . This gearing may receive its power from the engine-shaft H' through bevel-wheel N on the shaft r^5 of the belt-pulley r' and a bevel-wheel N' on the shaft o of the pulley M', as indicated in Fig. 9. At the terminus or delivery end of the second conveyer-bed frame C⁵ assorting-chains L³ L⁴ L⁵ L⁶ L⁷ L⁸ L⁹ L¹⁰ L¹², of different lengths, are arranged on sprocket-wheel shafts P P' P² P³ P⁴ P⁵ P⁶ P⁷ P⁸, a part of said shafts being positively driven by gears and chains and the other portions by the chains only. These chains and shafts are mounted upon a suitable framing C⁶, and the shafts P', P⁴, P⁶, and P⁸ are driven by gears $s s'$ on a long shaft s^2 , which is set in motion by a pulley or sheave s^3 and belt or rope s^4 , belonging to the train of gearing which drives the rollers of the sec-

ond conveyer-bed, and also the driving belt or rope, and kept at proper tension by the tension device t^6 .

Under the system of gearing shown and described the puller will have a speed which enables it to take the lumber as fast as put onto the floating horses, and the conveyer will have a speed to enable it to properly receive the lumber from the puller, and thus have one piece always behind another, and, in connection with such relative speeding of the elevating and conveying devices, the lugs on the elevating-chains must be arranged so that the lumber drops onto the conveyer from opposite corners, thereby preventing overlapping of one piece onto another piece while dropping into the conveyer-trough. As before stated, the speed of the transfer-chains must be relatively very slow—say about twenty-five to thirty feet per minute—and thereby enable the grader to inspect perfectly every piece as it passes. After the lumber leaves the transfer-chains the next section of the conveyer will have a speed fast enough to scatter the lumber, so that when it arrives at the automatic length-assorter there will be room enough between each piece of lumber to allow the assorter to perform its work without liability of one piece getting onto another.

The outside assorter-chain L^4 is long enough to support the longest pieces of lumber at one end, and by this chain and the chains L^5 and L^{12} both ends of such pieces of lumber will be supported till they arrive at the points of discharge. The chain L^5 is long enough to support, in conjunction with chain L^4 , pieces of lumber of the next length. The chain L^6 is long enough to support, in conjunction with chain L^4 , pieces of lumber of the next length until they arrive at the point of discharge. Chains L^7 and L^{10} , together and in conjunction with chain L^4 , are long enough to support the pieces of lumber of the next length until they arrive at the point of discharge. Chain L^7 is long enough to support, in conjunction with chain L^4 , the next length, and chains L^8 L^9 , together and, in conjunction with chain L^4 , are long enough for the next lengths of lumber until they arrive at the point of discharge; and chain L^8 , in conjunction with chain L^4 , is long enough to support lumber of next length until it arrives at the point of discharge; and the steeple-chains will support pieces of lumber of shortest lengths until they pass onto chain L^4 and discharge upon the first director, and thus it will be seen that the lumber is assorted as to its length in the most-perfect manner and each piece of lumber is discharged at right angles to the direction of movement of the assorter-chains and directed lengthwise out of the assorter, so as to be conveniently placed upon the roller-beds V or V' . The chains which receive the pieces of timber from the second conveyer-bed frame C^5 are steeple-chains, and their links present beveled surfaces to the ends of the pieces of lumber as they pass onto the

said chains, and they have no spaces between them narrow enough for lumber to pass down between the chains, but forward of the chains L^3 . The spaces t of the chains L^4 to L^{12} have gradually-increased width between them in the order illustrated, so that the graded lumber of different lengths may pass down upon the flooring R' of the shed or house R^2 . Beneath the spaces t , through which the different lengths of graded lumber pass, are arranged inclined directing boards or platforms T , on which the pieces of lumber gradually and properly glide to the flooring R' . On each side of the assorting-chains, on a level with the flooring, roller-beds V V' for the reception of the graded and assorted lumber are constructed, and upon these roller-beds the lumber, as fast as it descends from the assorting-chains, is placed, the different lengths and grades being moved by hand or motive power to the proper positions on said roller-beds and afterward taken on wagons to yards.

By my invention, as herein described, lumber is taken from the rafts on rivers or streams, elevated, deposited upon a conveyer, brushed, washed, graded, assorted, and arranged in graded and assorted condition at the place from which it is carried in wagons to yards or places of use, the operation being continuously and very expeditiously performed.

In carrying out my invention the second or long conveyer frame-bed C^5 might not be used in some places, and in such construction the lumber-assorter would be placed immediately at the end of the transfer formed of the steeple and transfer chains L L' L^2 and the lumber after passing from the grader's stand or house R pass directly from the chain L^2 to the steeple-chains L^3 and assorter-chains L^4 L^5 L^6 , &c., and assorted as before described.

The puller and elevator mechanism is represented as being on both sides of the first conveyer-bed frame C^3 ; but it may be only practicable in some cases to have such mechanism on one side of said bed, and instead of building the puller to lay out in the river it may be necessary to build it to lay up or down stream. The system of gearing for operating the machinery will have to be modified according to the necessity of the case and as found best, and the first and second conveyers may consist of either live rolls, chains, or metal cables. The washer may have one or two heads and the scouring-brush may also be constructed with one or two heads, the brushes being made of wire or other suitable material, and if desired the brushes may be revolved so as to more effectually loosen from the lumber the mud which may have accumulated upon it while on the bottom of the rafts, and thus facilitate its removal by the washer. In using pullers and elevators on each side of the first conveyer the lugs of the chains should be so arranged that when lumber is dumping into the trough at one end on one side and

lumber is dumping into it, at the other end on the other side the lengths of the two dumps will not lap upon one another on the trough, and thus one length will have time to run through the washer before other loads are dumped into the trough at diagonally-opposite corners.

In operating with the mechanism described the labor of grading is decreased and injury to sawing and planing machinery avoided, as clean lumber can be graded more rapidly and conveniently than dirty lumber, and as such lumber does not dull saws and planing-tools as rapidly as lumber covered with grit and dirt. The washing of the lumber in its passage to the grader is accomplished perfectly as the pieces of lumber pass through the brush-heads and washer-heads and are subjected to the brushing action and to the action of water forcibly thrown upon it from the numerous jet-passages, the power for forcing the water being a steam or other motive-power operated pump, which draws its supply of water from the river or stream or well, and is operated by the engine or other motive power which drives the other machinery.

The utility of my invention will be readily seen when it is considered that down the Mississippi and other large rivers the lumber which is sent in rafts has to be taken out of the water by hand and the mud that collects on the lumber in going down the river is washed off by throwing water on it with pails as the raft is taken apart. The lumber is piled on the shore on platforms built for that purpose, and from thence it is loaded on wagons and hauled to the yard, quite a distance sometimes, and dumped on the ground, then graded and carried to where it is put onto the pile, this operation making it rather expensive in handling the lumber for transfer from the rafts to the yard. My invention, of combined automatic puller and elevator, traveling conveyer, automatic washer, right-angled-arranged steeple-chains and transfers on which the lumber is graded as it passes along an automatic assorter for assorting the different lengths, and roller or other suitable beds adapted for different lengths from which when sufficient quantities have accumulated it can be shoved onto roll-bed wagons and taken to the pile in the yard to which it belongs, effects a great saving, does away with a large number of men and all teams, except such as are required for taking it from the assorter into the yard, one horse carrying two hundred thousand feet per day in this way when assorter is placed in or near the yard.

What I claim as my invention is—

1. An organized mechanism for automatically carrying lumber from rafts on rivers or streams to the place of deposit, comprising a main or first continuously-operating conveyer-bed, inclined conducting-boards on the sides of the bed, which, with the bed, form a guiding-trough, timber-supporting floating horses arranged in the water of the river or stream

on one or both sides of the conveyer-bed and adapted for separate pieces of timber to ride or rest on them lengthwise of the said conveyer-bed, endless pulling and elevating chains arranged between the conveyer-bed and the bed of the river or stream and adapted to take the pieces of timber continuously one after the other from the horses and pull and elevate them up to the trough and deposit them on the inclined boards thereof, so as to have them descend and rest lengthwise upon the conveyer-bed to be conveyed thereon, transverse transfer-chains having the sections which receive the pieces of timber successively from the conveyer-bed formed of links beveled from bottom to top, said links forming steeple-chains, substantially as and for the purpose described.

2. The arrangement of one or more automatic brushes on the framework of the conveyer-bed and between the pulling and elevating chains which elevate the pieces of timber from floating horses and deposit them upon the conveyer-bed and the steeple-chain section of the transfer-chains, substantially as described.

3. An automatic lumber-washer connected with a water-power forcing means and arranged upon the framework of the organized mechanism between the pulling and elevating chains which elevate the pieces from the floating horses and deposit them upon the conveyer-bed and the steeple-chain section of the transfer-chains, substantially as described.

4. An organized mechanism for automatically carrying lumber from rafts on rivers or streams to the place of deposit, comprising a main or first continuously-operating conveyer-bed, inclined conducting-boards on the sides of the bed and forming with the bed a guiding-trough, timber-supporting floating horses arranged in the water of a stream or river on one or both sides of the conveyer-bed and adapted for separate pieces of timber to ride or rest on them lengthwise of said bed, endless pulling and elevating chains arranged between the conveyer-bed and the bed of the river and adapted to take the pieces of timber continuously one after another from the floating horses and pull and elevate them to the trough and deposit them on the inclined boards thereof, so as to have them descend and rest lengthwise upon the conveyer-bed to be conveyed thereon, transfer-chains having the sections which receive the pieces of timber successively from the conveyer-bed formed of links beveled from bottom to top, so as to form steeple-chains, and a grader's stand located between the receiving and discharging section of the transfer-chains, substantially as described.

5. An organized mechanism for automatically carrying lumber from rafts on rivers or streams to the place of deposit, comprising a main or first continuously-operating conveyer-bed, inclined conducting-boards on the sides of the bed forming with the bed a guiding-

trough, timber-supporting floating horses arranged in the water of a stream or river on one or both sides of the conveyer-bed and adapted for separate pieces of timber to ride or rest on them lengthwise of said bed, endless pulling and elevating chains arranged between the conveyer-bed and the bed of the river and adapted to take the pieces of timber continuously one after another from the floating horses and pull and elevate them up to the trough and deposit them on the inclined boards thereof, so as to have them descend and rest lengthwise upon the conveyer-bed to be conveyed thereon, transfer-chains having the sections which receive the pieces of timber successively from the conveyer-bed formed of links beveled from bottom to top, so as to form steeple-chains, and a grader's stand located between the receiving and discharging sections of the transfer-chains, and gearing for giving a slow movement to the transfer-chains and a faster movement to the conveyer-bed, substantially as described.

6. An organized mechanism for automatically carrying lumber from rafts on rivers or streams to the place of deposit, comprising a main or first continuously-operating conveyer-bed, inclined conducting-boards on the sides of the bed forming with the bed a guiding-trough, timber-supporting floating horses arranged in the water of a stream or river on one or both sides of the conveyer-bed and adapted for separate pieces of timber to ride or rest on them lengthwise of said bed, endless pulling and elevating chains arranged between the conveyer-bed and the bed of the river and adapted to take the pieces of timber continuously one after another from the floating horses and elevate them up to the trough and deposit them on the inclined boards thereof, so as to have them descend and rest lengthwise on the conveyer-bed to be conveyed thereon, transfer-chains having the sections which receive the pieces of timber successively from the conveyer-bed formed of links beveled from bottom to top, so as to form steeple-chains, and a grader's stand located between the receiving and discharging section of the transfer-chains, and gearing for giving a slow movement to the transfer-chains and a faster movement to the conveyer-bed, and an automatic washer connected with a water-power forcing means and arranged upon the framework of the organized mechanism, substantially as described.

7. An organized mechanism for automatically carrying lumber from rafts on rivers or streams to the place of deposit, comprising a main or first continuously-operating conveyer-bed, inclined conducting-boards on the sides of the bed forming with the bed a guiding-trough, timber-supporting floating horses arranged in the water of a stream or river on one or both sides of the conveyer-bed and adapted for separate pieces of timber to ride or rest upon them lengthwise of said bed, endless pulling and elevating chains arranged

between the conveyer-bed and the bed of the river and adapted to take the pieces of lumber continuously one after another from the floating horses and pull and elevate them to the trough and deposit them on the inclined boards thereof, so as to have them descend and rest lengthwise on the conveyer-bed to be conveyed thereon, transfer-chains having the sections which receive the pieces of timber successively from the conveyer-bed formed of links beveled from bottom to top, so as to form steeple-chains, a grader's stand located between the receiving and discharging sections of the transfer-chains, gearing for giving a slow movement to the transfer-chains and a faster movement to the conveyer-bed, an automatic washer connected with a water-power forcing means and arranged upon the framework of the organized mechanism, and an automatic scouring-brush arranged upon the framework of the bed behind the washer, substantially as described.

8. An organized mechanism for automatically carrying lumber from rafts on rivers or streams to the place of deposit, comprising a main or first continuously-operating conveyer-bed, inclined conducting-boards on the sides of the bed forming with the bed a guiding-trough, timber-supporting floating horses arranged in the water of a stream or river on one or both sides of the conveyer-bed and adapted for separate pieces of timber to ride or rest upon them lengthwise of said bed, endless pulling and elevating chains arranged between the conveyer-bed and the bed of the river and adapted to take the pieces of timber continuously one after another from the floating horses and pull and elevate them to the trough and deposit them on the inclined boards thereof, so as to have them descend and rest lengthwise upon the conveyer-bed to be conveyed thereon, transfer-chains having the sections which receive the pieces of timber successively from the conveyer-bed formed of links beveled from bottom to top, so as to form steeple-chains, a grader's stand located between the receiving and discharging sections of the transfer-chains, gearing for giving a slow movement to the transfer-chains and a faster movement to the conveyer-bed, an automatic washer connected with a water-power forcing means and arranged upon the framework of the organized mechanism, an automatic scouring-brush arranged upon the framework of the bed behind the washer, and the second continuously-operating conveyer-bed adapted to receive and convey the lumber lengthwise, substantially as described.

9. An organized mechanism for automatically carrying lumber from rafts on rivers or streams to the place of deposit, comprising a main or first continuously-operating conveyer-bed, inclined conducting-boards on the sides of the bed forming with the bed a guiding-trough, timber-supporting floating horses arranged in the water of a stream or river on one or both sides of the conveyer-bed and

adapted for separate pieces of lumber to ride or rest on them lengthwise of said bed, endless pulling and elevating chains arranged between the conveyer-bed and the bed of the river and adapted to take the pieces of timber continuously one after another from the floating horses and pull and elevate them to the trough and deposit them on the inclined boards thereof, so as to have them descend and rest lengthwise upon the conveyer-bed to be conveyed thereon, transfer-chains having the sections which receive the pieces of timber successively from the conveyer-bed formed of links beveled from bottom to top, so as to form steeple-chains, a grader's stand located between the receiving and discharging section of the transfer-chains, steeple-chains L^3 , and an assorter comprising carrying-chains of different lengths with discharge-space and director at their respective forward ends, two of said chains being of lengths to afford a support for the longest pieces at both ends till they arrive at their points of discharge, and thereupon one of said chains ceasing to support the lumber and the other chains of lengths adapted for supporting the pieces of lumber at both ends until they arrive at their respective points of discharge, and thereupon ceasing to support them at one of their ends, substantially as described.

10. An organized mechanism for automatically carrying lumber from rafts on rivers or streams to the place of deposit, comprising a main or first continuously-operating conveyer-bed, inclined conducting-boards on the sides of the bed forming with the bed a guiding-trough, timber-supporting floating horses arranged in the water of a stream or river on one or both sides of the conveyer-bed and adapted for separate pieces of timber to ride or rest upon them lengthwise of said bed, endless pulling and elevating chains arranged between the conveyer-bed and the bed of the river and adapted to take the pieces of lumber continuously one after another from the floating horses and pull and elevate them to the trough and deposit them on the inclined boards thereof, so as to have them descend and rest lengthwise upon the conveyer-bed to be conveyed thereon, transfer-chains having the sections which receive the pieces of timber successively from the conveyer-bed formed of links beveled from bottom to top, so as to form steeple-chains, a grader's stand located between the receiving and discharging sections of the transfer-chains, gearing for giving a slow movement to the transfer-chains and a faster movement to the conveyer-bed, an automatic washer connected with a water-power forcing means and arranged upon the framework of the organized mechanism, an automatic scouring-brush arranged upon the framework of the bed behind the washer, the second continuously-operating conveyer-bed adapted to receive and convey the lumber lengthwise, steeple-chains, and

the specified assorter-chains, substantially as described.

11. The lumber-assorter comprising carrying-chains of different lengths with discharge-space at their respective forward ends, one of said chains being of a length to afford a support for the longest pieces of lumber at one end, and with two other shorter chains of the series to insure support of such pieces at both ends till they arrive at their point of discharge and the other shorter chains also being of lengths adapted, in conjunction with the chain L^4 , to insure the support of pieces of lumber of varying lengths at both ends until they arrive at their respective points of discharge, and thereupon said respective short chains ceasing to support the pieces of lumber at one of their ends, substantially as described.

12. The combination, with the steeple transfer-chains L^3 , of the described lumber-assorter, comprising carrying-chains of different lengths with discharge-space at their respective forward ends, one of said chains being of a length to afford a support for the longest pieces at one end, and with two other shorter chains of the series to insure the support of such pieces at both ends till they arrive at their point of discharge, and other shorter chains also being of lengths adapted, in conjunction with the chain L^4 , to insure the support of the pieces of lumber of varying lengths at both ends until they arrive at their respective points of discharge, and thereupon said respective shorter chains ceasing to support the pieces of lumber at one of their ends, substantially as described.

13. The combination, with the directors T and the roller-bed, of the described assorter-chains, one of said chains being of a length to afford a support for the longest pieces at one end and with two other shorter chains of the series to insure the support of such pieces at both ends till they arrive at their point of discharge, and the other shorter chains also being of lengths adapted, in conjunction with the chain L^4 , to insure the support of the pieces of lumber at both ends until they arrive at their respective points of discharge, and thereupon said respective shorter chains ceasing to support them at one of their ends, substantially as described.

14. An automatic lumber-assorter comprising a supporting-frame having a series of successive and constantly-open lumber-discharging spaces and traveling lumber-carrying chains constructed and arranged to receive, support, and carry pieces of lumber of different lengths until they arrive at spaces adapted for their discharge and then cease to support the respective pieces and allow them to discharge through spaces suited to their respective lengths, substantially as described.

15. An automatic lumber-assorter comprising chains of varying lengths, one of said chains extending the entire length of the assorter and adapted to receive and support one

end of all lengths of lumber during the conveyance and the other ends being supported and conveyed by the other chains of varying lengths until delivered to the proper discharging-spaces, substantially as described.

16. An automatic lumber-assorter comprising a supporting-frame having discharging-spaces adapted for the passage through them of pieces of lumber of different lengths and traveling, carrying, and supporting chains of varying lengths, one of said chains extending the entire length of the assorter and receiving, supporting, and carrying one end of all the lengths or pieces during their conveyance by the assorter-chains, and the other ends of the pieces of lumber being supported and conveyed by other chains of varying lengths until delivered to the proper discharging-spaces, substantially as described.

17. The combination of a conveyer, pulling and elevating chains arranged on the side of the conveyer between its ends and between it and the river-bed, lumber-supporting floating horses arranged to receive the pieces of lumber lengthwise of the conveyer, and steeple transfer-chains arranged transversely to the conveyer, substantially as described.

18. The combination of the first conveyer and steeple transfer-chains presenting beveled surfaces to the ends of the pieces of lumber as they pass upon them and arranged transversely to said conveyer, substantially as described.

19. The combination of the first conveyer, the first steeple transfer-chains presenting beveled surfaces to the ends of the pieces of lumber as they pass upon them and arranged transversely to the said conveyer, the grader's stand, the steeple-chains L^3 , and the assorter-chains, substantially as described.

20. The combination of the first conveyer, steeple transfer-chains arranged transversely to the conveyer, the second conveyer, and the assorter-chains formed of different lengths, substantially as described.

21. The combination of the assorter comprising chains, as L^4 to L^{12} , of different lengths, inclined directors T , suitable beds for the graded and sorted lumber, steeple transfer-chains L^3 , and a suitable conveyer arranged transversely to the said steeple-chains, substantially as described.

22. The combination of the automatic washer, water-forcing means, the conveyer, the steeple transfer-chains arranged transversely to the conveyer, and the grader's stand, substantially as described.

23. The combination of the pulling and elevating chains, the conveyer, the automatic washer, water-forcing means, the steeple transfer-chains arranged transversely to the conveyer, and the grader's stand, substantially as described.

24. The combination of the pulling and elevating chains, lumber-supporting floating horses, the conveyer, the automatic washer,

water-power forcing means, the steeple transfer-chains arranged transversely to the conveyer, and the grader's stand, substantially as described.

25. The combination of the conveyer, automatic scouring-brush, automatic washer, water-forcing means, steeple transfer-chains arranged transversely to the conveyer, and the grader's stand, substantially as described.

26. The combination of a suitable conveyer, the automatic washer, water-forcing means, steeple transfer-chains arranged transversely to said conveyer, and the assorter-chains, substantially as described.

27. The combination of the automatic washer, water-forcing means, the first and second conveyers, the steeple transfer-chains L , arranged between and transversely to the said conveyer, steeple transfer-chains L^3 , and the assorter-chains of different lengths, substantially as described.

28. The combination of the automatic washer, water-forcing means, suitable conveyer, the steeple transfer-chains L and L^3 , those L being arranged transversely to the said conveyer and those L^3 parallel therewith, the assorter-chains, and the inclined lumber-directors, substantially as described.

29. The combination of the automatic washer, water-forcing means, the automatic scouring-brush, suitable conveyer, the steeple transfer-chains arranged transversely to said conveyer, the grader's stand, the assorter-chains of different lengths, the inclined directors, and suitable beds for receiving the graded and assorted lumber, substantially as described.

30. The combination of the grader's stand, conveyer-bed, and steeple transfer-chains which present beveled surfaces to the pieces of lumber as they pass upon them and are arranged transversely to the conveyer-bed and move at a slower speed than the conveyer, substantially as described.

31. The combination of the engine, pump, pulling and elevating chains, lumber-supporting floating horses, automatic washer-head, first conveyer, inclined boards on sides of said conveyer, steeple transfer-chains presenting beveled surfaces to the ends of the pieces of lumber as they pass upon them and arranged transversely to the conveyer, the grader's stand, the second conveyer, assorter-chains of different lengths, inclined directors, roller-beds for receiving the graded and assorted lumber, and gearing for communicating motion to the first and second conveyers and to the transfer and assorting chains, substantially as described.

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

JAMES D. HILLS.

Witnesses:

W. H. ALLIN,
E. J. NEWSOM.