

No. 777,122.

PATENTED DEC. 13, 1904.

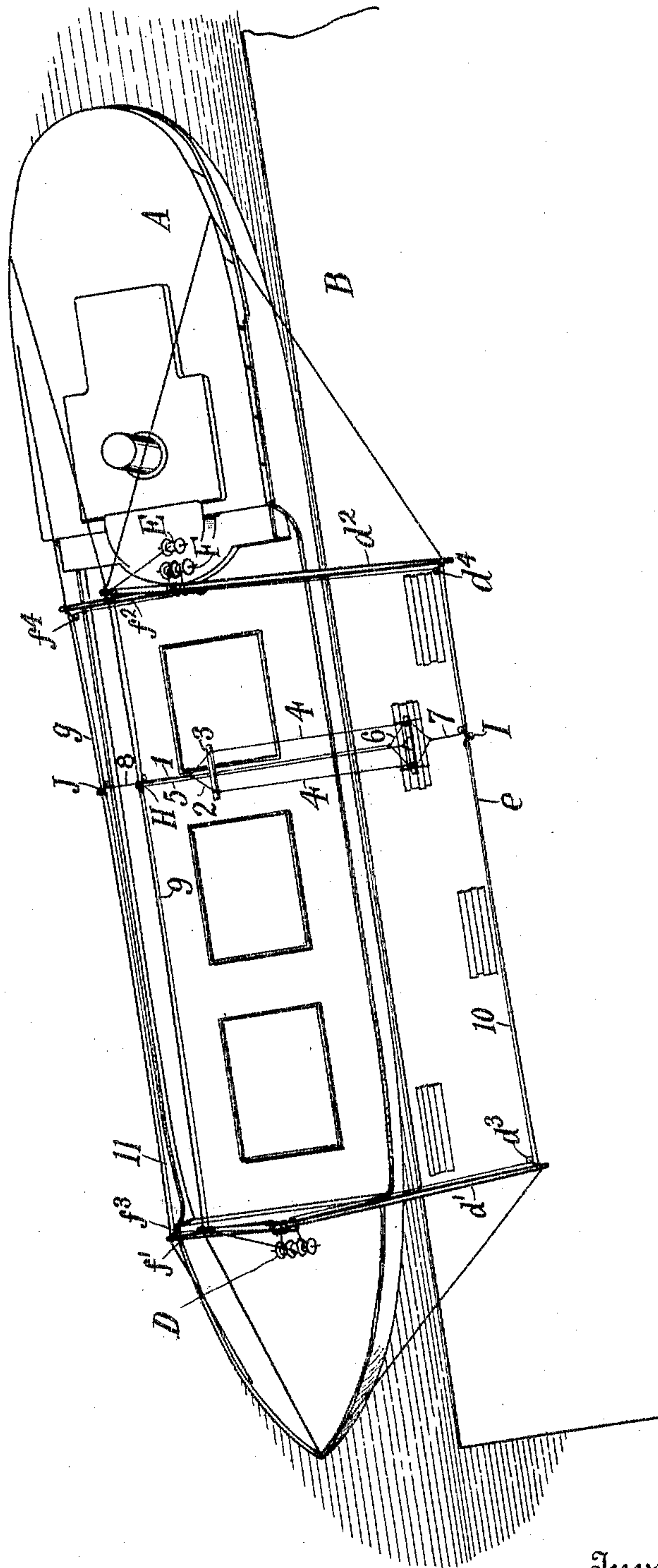
T. S. MILLER.
HOISTING AND CONVEYING APPARATUS.

APPLICATION FILED FEB. 29, 1904.

NO MODEL.

3 SHEETS—SHEET 1.

Fig. 1



Witnesses
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3 SHEETS—SHEET 2.

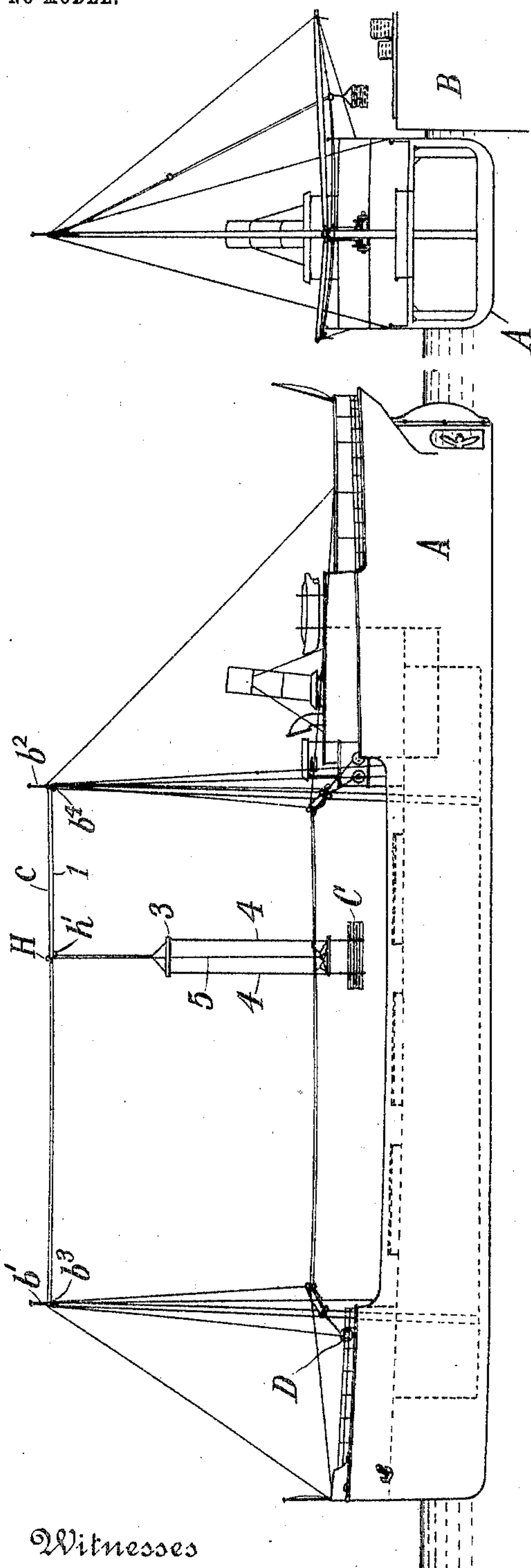


Fig. 1

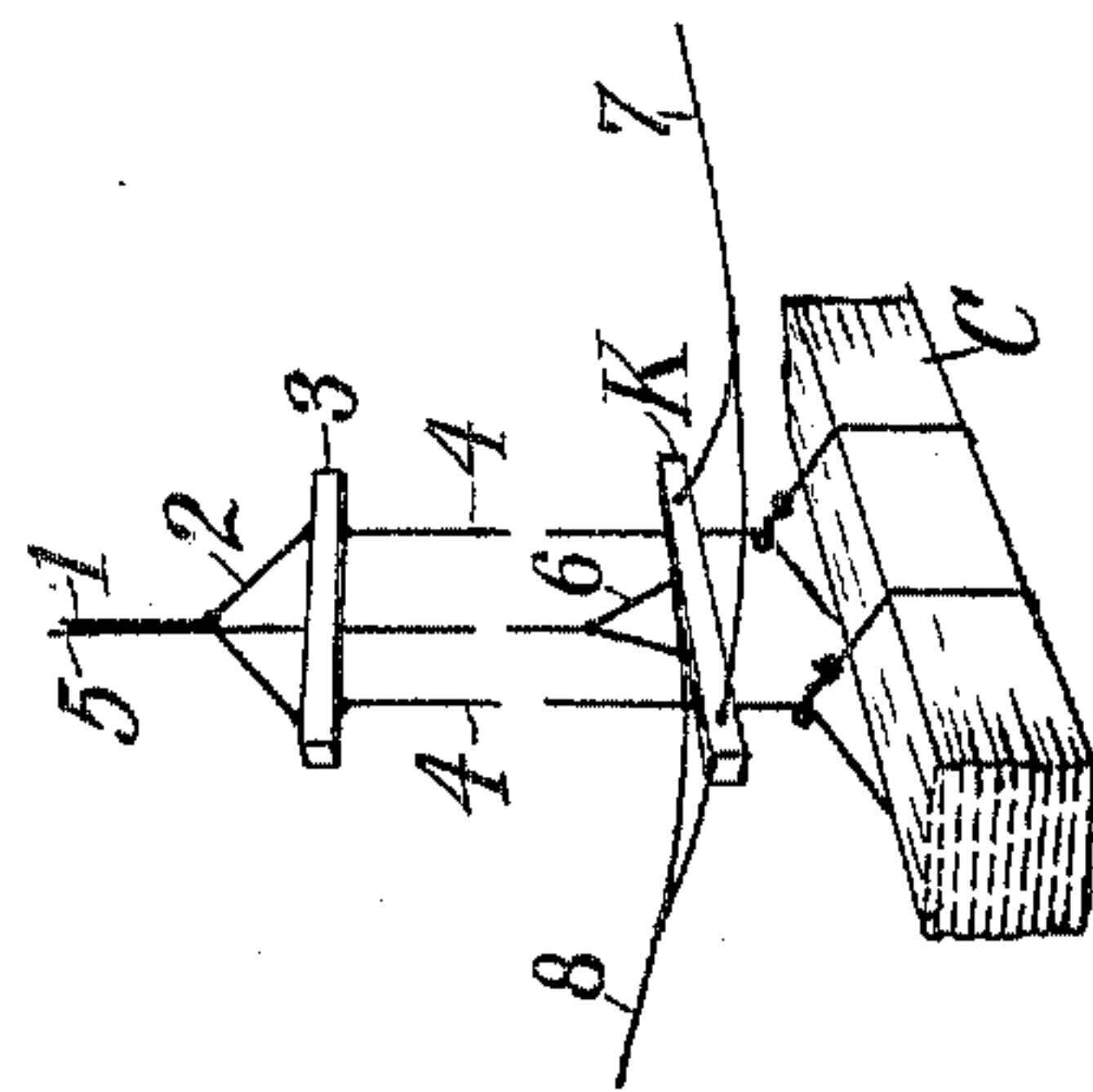


Fig. 2

Fig. 3

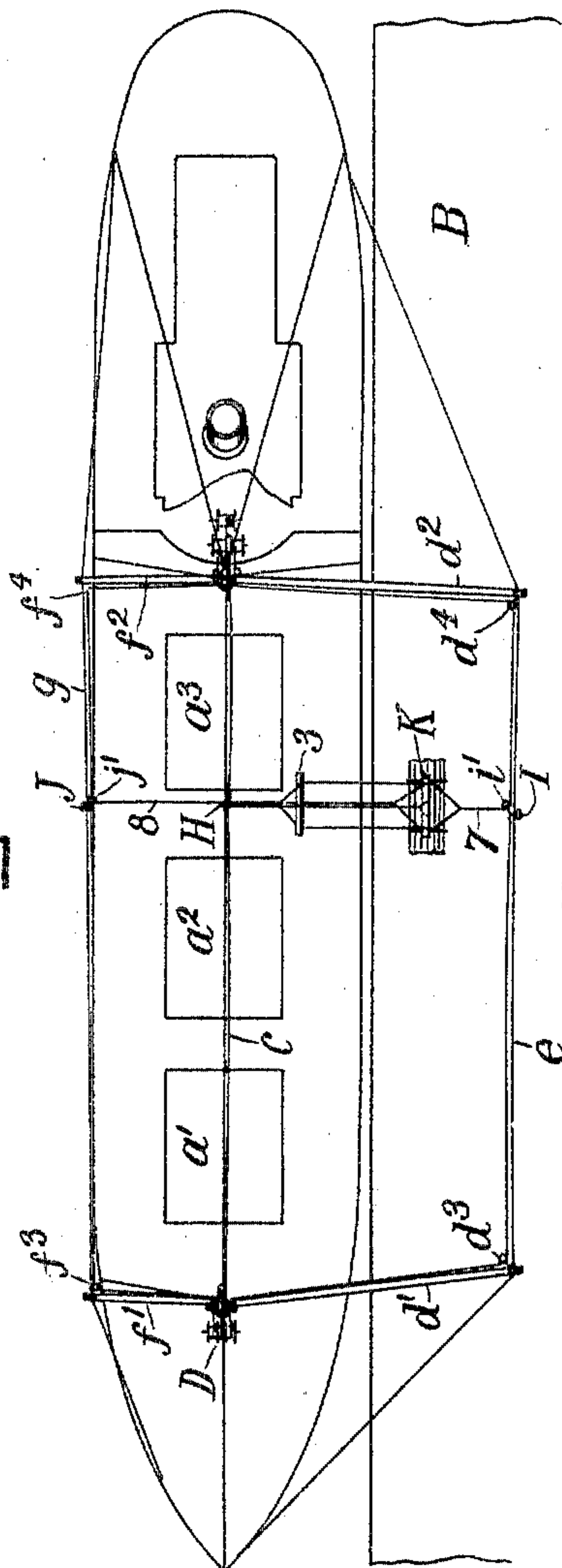


Fig. 4

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3 SHEETS—SHEET 3.

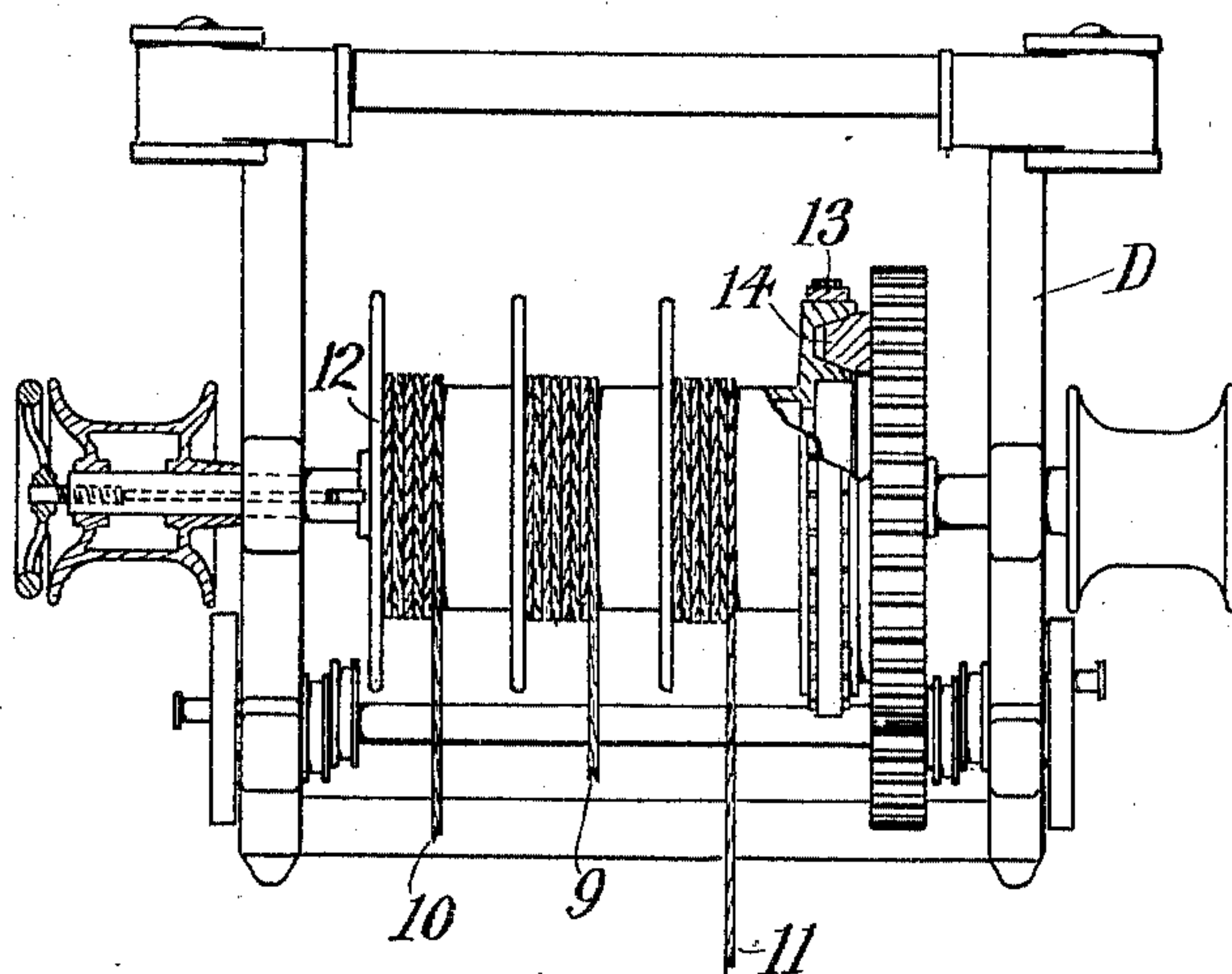


Fig. 6

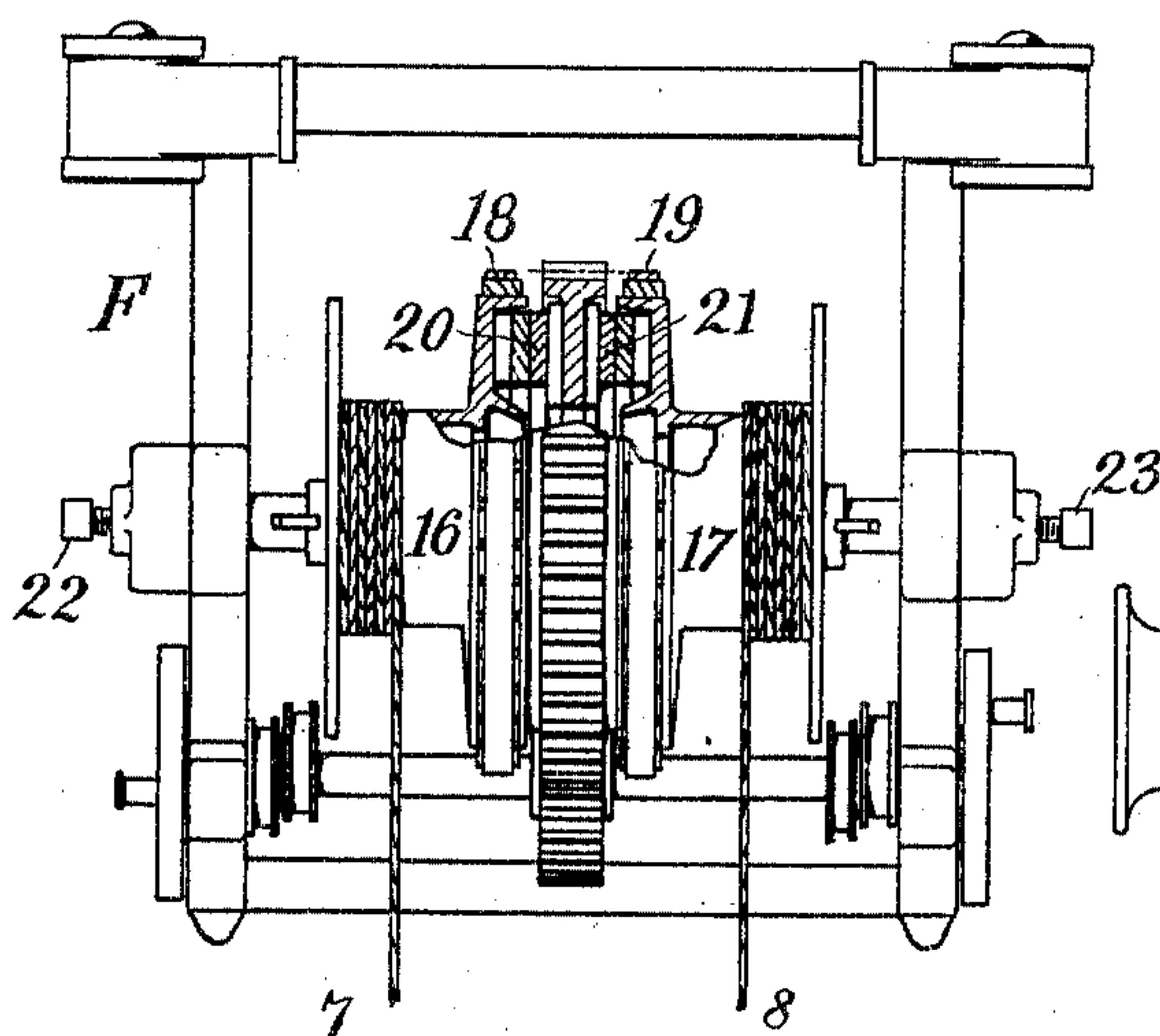


Fig. 7

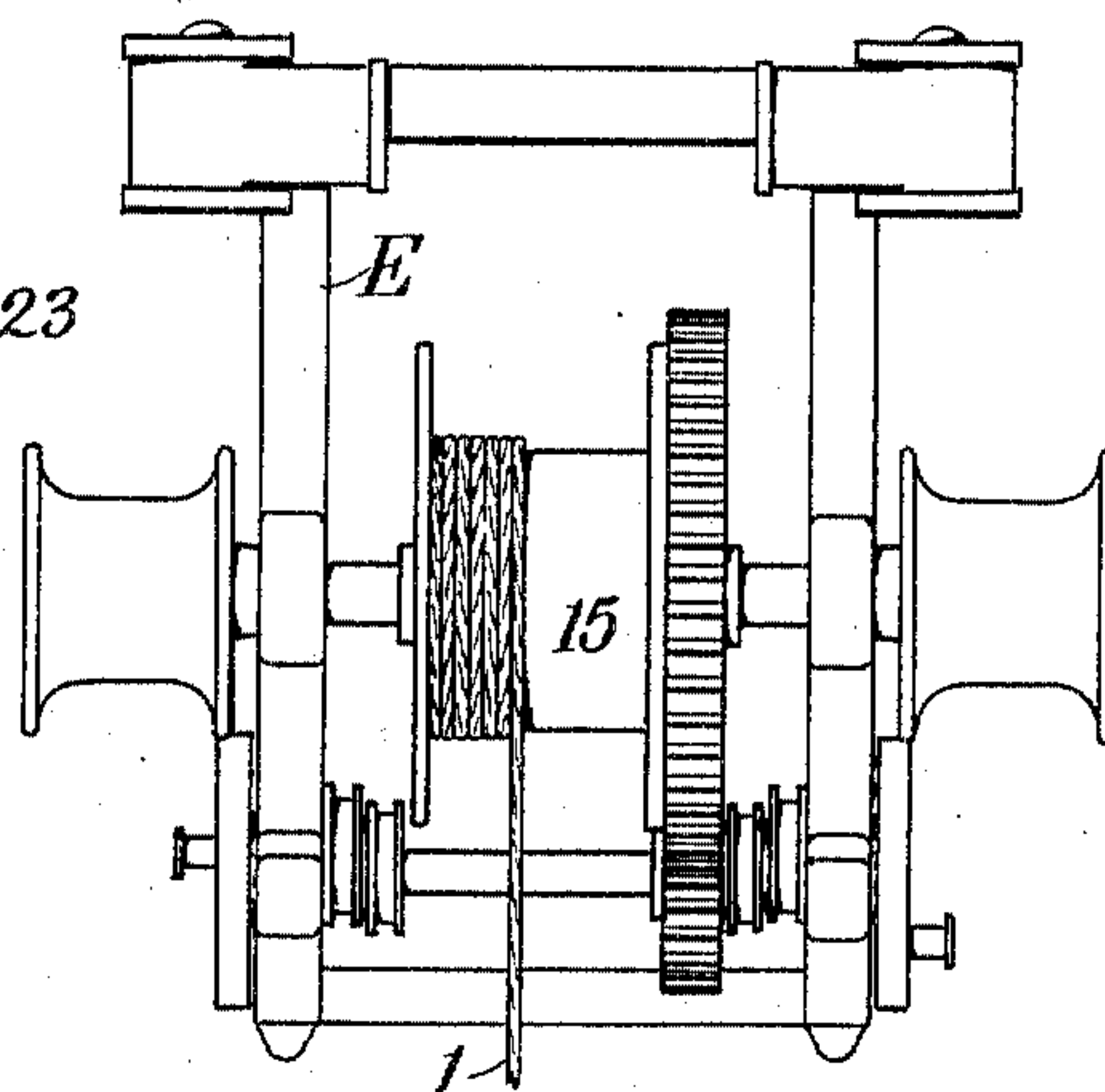


Fig. 8

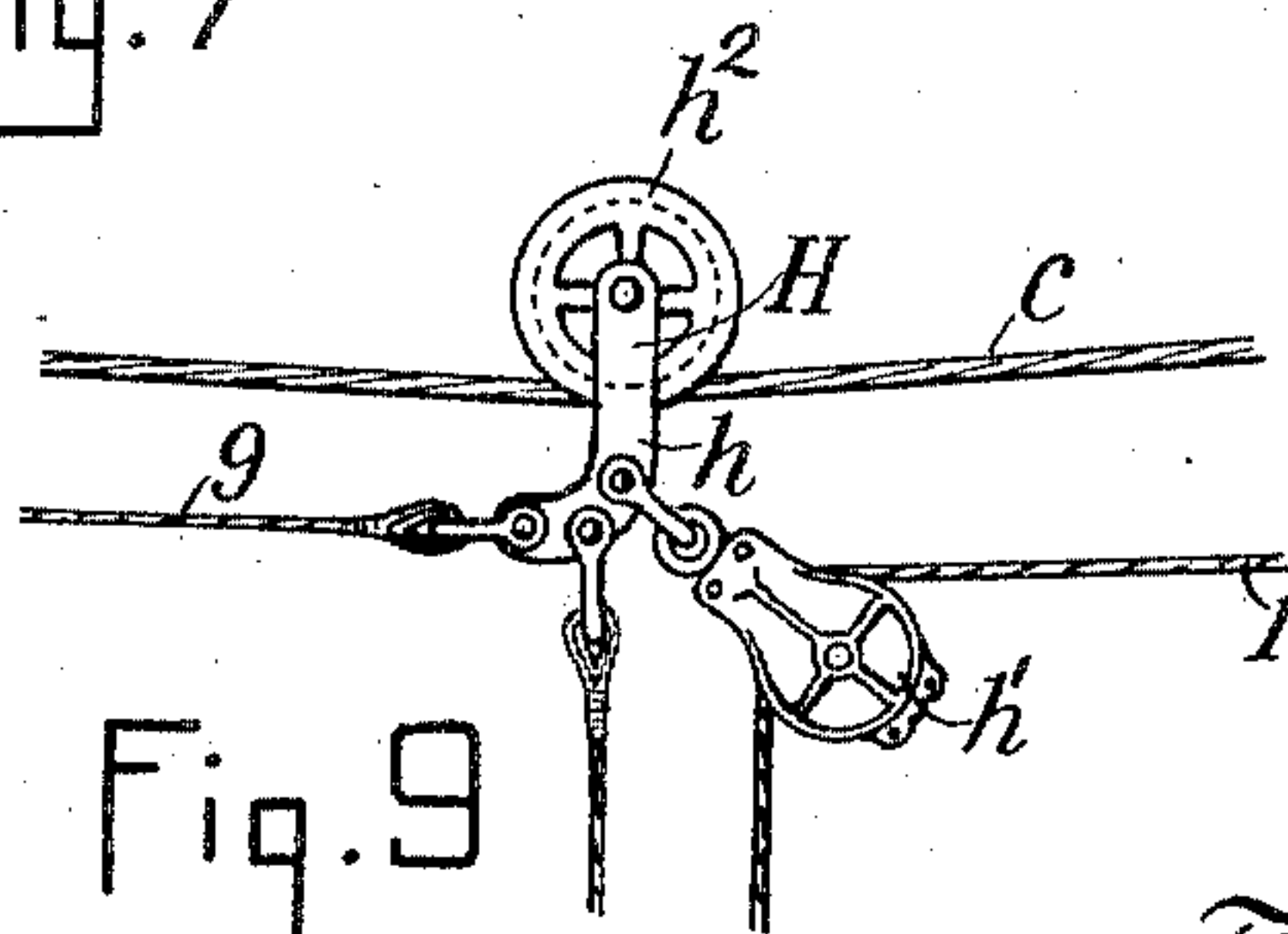


Fig. 9

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UNITED STATES PATENT OFFICE.

THOMAS SPENCER MILLER, OF SOUTH ORANGE, NEW JERSEY.

HOISTING AND CONVEYING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 777,122, dated December 13, 1904.

Application filed February 29, 1904. Serial No. 195,756. (No model.)

To all whom it may concern:

Be it known that I, THOMAS SPENCER MILLER, a citizen of the United States, and a resident of South Orange, county of Essex, and State of New Jersey, have invented a new and useful Hoisting and Conveying Apparatus, of which the following is a specification.

My present invention is particularly applicable to the transportation of loads between different points within a quadrilateral, although various features of it are susceptible of other useful applications.

In the accompanying drawings I have shown the invention as applied to the unloading of lumber from a ship.

Figure 1 is a perspective view. Fig. 2 is a plan view. Fig. 3 is a side view. Fig. 4 is a cross-sectional view, and Figs. 5, 6, 7, 8, and 9 are details.

A is the ship. B is the dock alongside. C is a load of lumber. a' a^2 a^3 are hatchways through the deck. b' b^2 are masts of extraordinary height, between the tops of which is stretched the cable c . d' d^2 are booms extending from the masts outboard over the dock. e is a cable stretched between the ends of said booms. f' f^2 are two booms extending in the opposite direction from the masts and between the ends of which is stretched the cable g . The quadrilateral formed by the booms d' d^2 f' f^2 and the cables e g includes within its field the hatchways and deck and a portion of the dock, or, in other words, the surface from various parts of which the loads are to be taken and the surface to which the loads are to be delivered. High overhead this quadrilateral is longitudinally crossed by the cable c .

H, I, and J are three trolleys or carriages running, respectively, on the cables c , e , and g . Each of these trolleys or carriages is constructed similar to the trolley H, (shown in Fig. 9,) consisting of a frame h , in which is journaled the wheel h^2 , running on the cable c .

The load C is suspended from trolley H by sheave-block h' , hoisting-rope 1, bridle 2, spreader 3, and slings 4 4, which slings are long enough to extend from the deck down to the bottom of the hold.

K is a swinger-guide suspended from trolley H by rope 5 and bridle 6. It engages the

slings 4 4, so that they slide up and down through it. It is bridled to the swinger-ropes 7 8, which extend, respectively, through the sheave-blocks i' and j' of the trolleys I and J.

The load when hoisted above deck may thus be swung between the cables e and g , and the plane in which it swings may be located at any point between the masts by the movement of the trolleys H, I, and J. In this way successive loads may be taken from different parts of the deck or from different hatchways and transferred to the same or different parts of the dock, or vice versa. The principle thus accomplished is exceedingly important, since it enables the preparation or collection of loads to be going on simultaneously at different points of the quadrilateral field of operations, which loads are taken successively by the apparatus, which therefore does not have to wait on the preparation of the loads.

I will next describe the means for moving the trolleys and operating the hoisting and swinging ropes. The trolleys are provided with the traction-ropes 9 10 11, which extend parallel with the cables and then parallel with the mast and booms to a common traction-actuator D, (shown in Fig. 6,) and located convenient to the mast b' . This actuator preferably consists of the three-part drum 12, controlled by a friction-brake 13 and friction-clutch 14. The trolleys are moved in one direction by inhauling ropes 9 10 11 and paying out ropes 1, 7, and 8 at the same time. Reversing the operation causes the trolleys to move in opposite direction.

The hoisting-rope 1 extends from the trolley H parallel with the cable c and thence down the mast b^2 to the hoist-actuator E, which preferably consists of the drum 15, operated by a reversible link-motion engine. (Diagrammatically shown in Fig. 8.)

The swinger-ropes 7 8 extend from the trolleys I and J parallel with the cables e and g and then parallel with the booms d^2 and f^2 to the swinger-actuator F, which preferably consists of the two drums 16 17, controlled, respectively, by the friction-brakes 18 19 and the slip friction-clutches 20 21, which are preferably constructed as described in my Patent

No. 715,111, and which clutches are respectively controlled manually by the screws 22 and 23. This actuator is intended to run continuously in one direction, thus maintaining
5 tension in both ropes all the time.

The operation is as follows: Starting from the bottom of a hatchway the fall or sling 4 4 is hoisted through the swinger-guide K until the load is above the deck. The drums may
10 then be operated to move the trolleys in unison to the desired point. Then the relative pressure of the slip friction-surfaces 20 and 21 is so adjusted that one overcomes the other sufficiently to swing the swinger-guide in the
15 direction desired and to the desired degree. Then the pressure of the friction-surfaces 20 and 21 is adjusted so as to hold the swinger-block in that position while the load is lowered and the hoisting-rope hoisted again, or
20 the swinger-guide may be held in this position by applying the friction-brake to one of the drums 16 or 17. Thereafter the operation is reversed for swinging the swinger-guide to any position from which it is desired to take
25 the next succeeding load. By skilful manipulation the hoisting or lowering operation may be going on at the same time with the swinging motion and the longitudinal motion, so that the pathway traversed by the load is a curved
30 pathway, being the minimum distance between the point of loading and unloading consistent with obstructions.

By controlling the swinger-ropes by the slip friction-surfaces shown those surfaces may
35 be held in contact during all parts of the operation, so as to exert a continual tension on the ropes and enable them to be handled with greater precision. This tension might be supplied by other forms of mechanism.

By the arrangement that I have above described it will also be observed that the correct operation of the swinger-ropes is not interfered with by a lack of parallelism in the trackways for the carriages I and J, such as
45 the lack of parallelism resulting from the difference in distance between said trackways at the center and ends, respectively, necessarily incident to the employment of cables.

The booms d' d'' f' f'' are pivotally secured
50 at their inner ends, so that when not in use they may be swung upward and secured against the masts. They are also made transposable, so that the longer and shorter booms, respectively, may be lowered on the opposite
55 side of the mast, thus permitting the apparatus to be used for receiving or discharging the cargo on either side of the ship.

Various modifications might be made of the apparatus above described while still embodying features of my invention. Some of these
60 may be mentioned, for example, as follows: One of the swinger-ropes, as 8, and all of the mechanism for supporting, guiding, and actuating it might be omitted, dependence being
65 had upon gravity to produce the back-

ward swing. The laterally-placed cables e and g , or either of them, might be for certain classes of work omitted, dependence being placed upon the tension of the ropes actuating the carriages I and J for guiding
70 their movement. The sheaves d^3 d^4 f^3 f^4 , by which these ropes are guided, may be fixed in their lateral positions by other means than by attachment to the ends of the booms.

Having thus described my invention, I claim
75 as new and desire to secure by Letters Patent—

1. In combination, a hoist-actuator, a hoisting-rope having an elevated approximately horizontal run and a fall pendent from said run, a swinger-guide through which said fall
80 operates and whereby the same is swung laterally from the vertical plane of said horizontal run.

2. In combination, a hoist-actuator, a carriage traveling to and from said hoist-actuator, a hoisting-rope extending from said hoist-actuator to said carriage and pendent therefrom, a swinger-guide through which the fall of said hoisting-rope operates and whereby the same is swung laterally from the vertical
90 plane of the carriage-pathway.

3. In combination, a head and tail support, an elevated fall-rope sheave traveling between the same, a hoisting-rope having an elevated run extending from one of said supports to
95 said sheave and a fall pendent therefrom and a swinger-guide through which said fall operates and whereby the same is swung laterally from the plane of said supports.

4. In combination, head and tail supports, a
100 fall-rope-sheave traveling in an elevated pathway between the same, a fall-rope pendent from said sheave, a swinger-rope sheave traveling in a lower and laterally-located pathway, a swinger-guide through which said fall-rope runs and a swinger-rope connecting said
105 guide with said swinger-rope sheave.

5. In combination, head and tail supports, a fall-rope sheave traveling between the same, a fall-rope, two swinger-rope sheaves each
110 traveling in a laterally-located pathway on opposite sides of said fall and a swinger-rope extending from each of the same to said fall.

6. In combination, the elevated sheaves b^3 , b^4 , the sheave-block h' traveling between the
115 same, a traction-rope extending from one of said sheaves to said sheave-block, a hoisting-rope extending from the other of said sheaves through said sheave-block, the laterally-located lower sheaves d^3 , d^4 , a sheave-block i'
120 traveling between the same, a traction-rope extending from one of the last-mentioned sheaves to said sheave-block and a swinger-rope extending from the other side of said last-mentioned sheaves through said sheave-
125 block and engaging with the fall.

7. In combination, the elevated sheaves b^3 , b^4 , the sheave-block h' traveling between the same, a traction-rope extending from one of
130 said sheaves to said sheave-block, a hoisting-

rope extending from the other of said sheaves through said sheave-block, the laterally-located lower sheaves d^3 , d^4 , a sheave-block i' traveling between the same, a traction-rope extending from one of the last-mentioned sheaves to said sheave-block and a swinger-rope extending from the other side of said last-mentioned sheaves through said sheave-block and engaging with the fall, the laterally-located sheaves f^3 , f^4 , the sheave-block j' traveling between the same, a traction-rope extending from one of said last-mentioned sheaves to said sheave-block, a swinger-rope extending from the other of said last-mentioned sheaves through said sheave-block and engaging with the fall.

8. In combination, an elevated trackway, a carriage thereon, a lower laterally-located trackway, a carriage thereon, a fall pendent from said elevated carriage and a swinger-rope from said lower carriage engaging said fall.

9. In combination, an elevated trackway, a carriage thereon, two lower trackways located laterally on each side of the vertical plane of said elevated trackway, a carriage on each of said lower trackways, a fall pendent from said elevated carriage and a swinger-rope extending to said fall from each of said lower carriages.

10. In combination, an elevated fall-rope sheave, a fall pendent therefrom, a hoist-actuator, two swinger-ropes extending in opposite directions from said fall, two swinger-actuators and means whereby they may be relatively controlled.

11. In combination, a hoist-actuator, a traction-actuator, a swinger-actuator, a hoisting-rope, a swinger-rope connecting said swinger-actuator with the fall of said hoisting-rope and means whereby said traction-actuator exerts its traction in opposition to said ropes.

12. In a boat, in combination, two masts, booms extending outboard therefrom, a hoisting-rope sheave, an elevated hoisting-rope sheave traveling between said masts, a swinger-rope sheave traveling between said booms, the hoisting-rope and the swinger-rope engaging therewith.

13. In a boat, in combination, two masts, booms extending outboard therefrom in both directions, an elevated hoisting-rope sheave traveling between said masts, a swinger-rope sheave traveling between each pair of said booms, a hoisting-rope and swinger-ropes engaging therewith.

14. In a boat, in combination, two masts, booms extending outboard therefrom, an elevated cable between said masts, a cable between said booms, a carriage on each of said cables, a fall-rope pendent from one of said carriages and a swinger-rope engaging therewith from the other of said carriages.

15. In a boat, in combination, two masts, booms extending outboard therefrom, a hoist-

ing-rope, a swinger-rope engaging therewith, a hoisting-rope sheave traveling between said masts, a swinger-rope sheave traveling between said booms, a traction-actuator connected with both of said sheaves, a swinger-actuator and a hoist-actuator; each of said actuators being located adjacent to one of said masts.

16. In combination, an elevated hoisting-rope sheave, a hoisting-rope, a hoist-actuator, two swinger-rope sheaves, two swinger-ropes, two swinger-rope actuators and a traction-actuator connected with all of said sheaves.

17. In a hoisting apparatus, in combination, a hoisting-rope, an elevated support from which it is pendent, a swinger-guide engaging the pendent portion of said hoisting-rope below said elevated support and the following means whereby said swinger-guide is moved in two vertical planes, viz: a swinger-rope extending from said guide in the plane of swing and a rope forming a running engagement with said swinger-rope and extending laterally from said plane of swing.

18. In a hoisting apparatus, in combination, a hoisting-rope, an elevated support from which it is pendent, a swinger-guide engaging the pendent portion of the hoisting-rope below said elevated support and the following means whereby said swinger-guide is moved in two vertical planes, viz: two swinger-ropes extending from said guide in opposite directions in the plane of swing and two ropes each forming a running engagement with one of said swinger-ropes and extending laterally to the plane of swing.

19. In a hoisting apparatus, in combination, a hoisting-rope, an elevated support from which it is pendent, a swinger-guide engaging the pendent portion of the hoisting-rope below said elevated support and the following means whereby said swinger-guide is moved in two vertical planes, viz: two swinger-ropes extending from said guide in opposite directions in the plane of swing and two ropes each forming a running engagement with one of said swinger-ropes and extending laterally to the plane of swing, said swinger-ropes extending from said running engagement laterally to the plane of swing in the opposite direction.

20. In a hoisting apparatus, in combination, a hoisting-rope, an elevated support from which it is pendent, a swinger-guide engaging the pendent portion of the hoisting-rope below said elevated support, a swinger-rope extending from said swinger-guide in the plane of swing and the following means whereby said swinger-guide and the pendent portion of said hoisting-rope are moved laterally to the plane of swing, viz: two ropes one of which forms a running connection with said hoisting-rope and the other with said swinging rope and each of which extends away from the plane of swing.

21. In a hoisting apparatus, in combination,

a hoisting-rope, an elevated support from which it is pendent, a swinger-guide engaging the pendent portion of the hoisting-rope below said elevated support and the following
5 means whereby said swinger-guide is moved into two vertical planes, viz: a trackway extending transversely to the plane of swing, a carriage thereon, a swinger-rope extending from said swinger-guide to said carriage and
10 thence away from the plane of swing and a

traction-rope extending from said carriage in the opposite direction away from the plane of swing.

In testimony whereof I have hereunto signed my name in the presence of two subscribing
15 witnesses.

THOMAS SPENCER MILLER.

Witnesses:

JOHN SINCLAIR,

J. J. DERRICK.