

No. 737,947.

PATENTED SEPT. 1, 1903.

I. I. MORRIS.

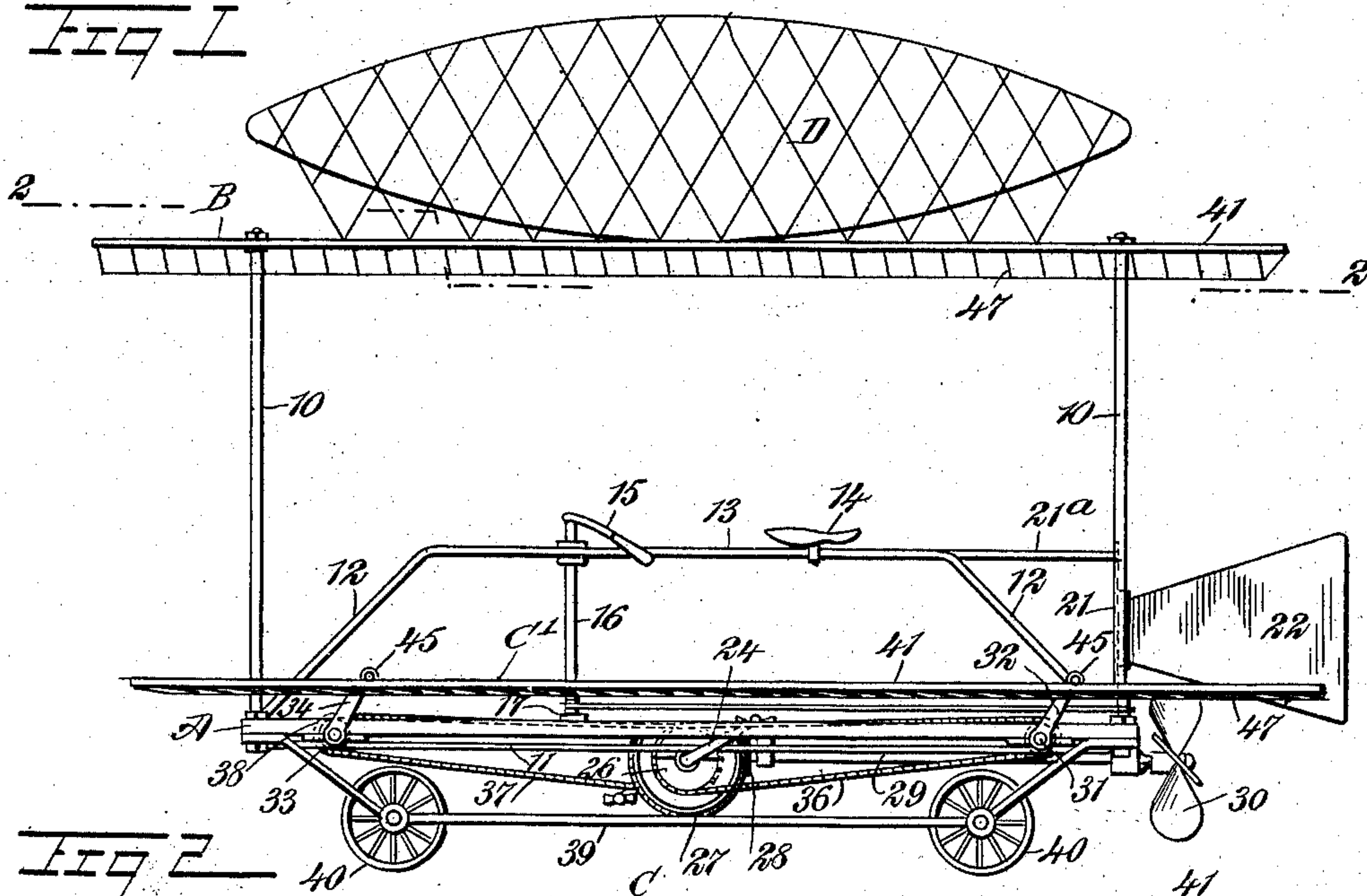
MACHINE FOR AERIAL NAVIGATION.

APPLICATION FILED JULY 15, 1902.

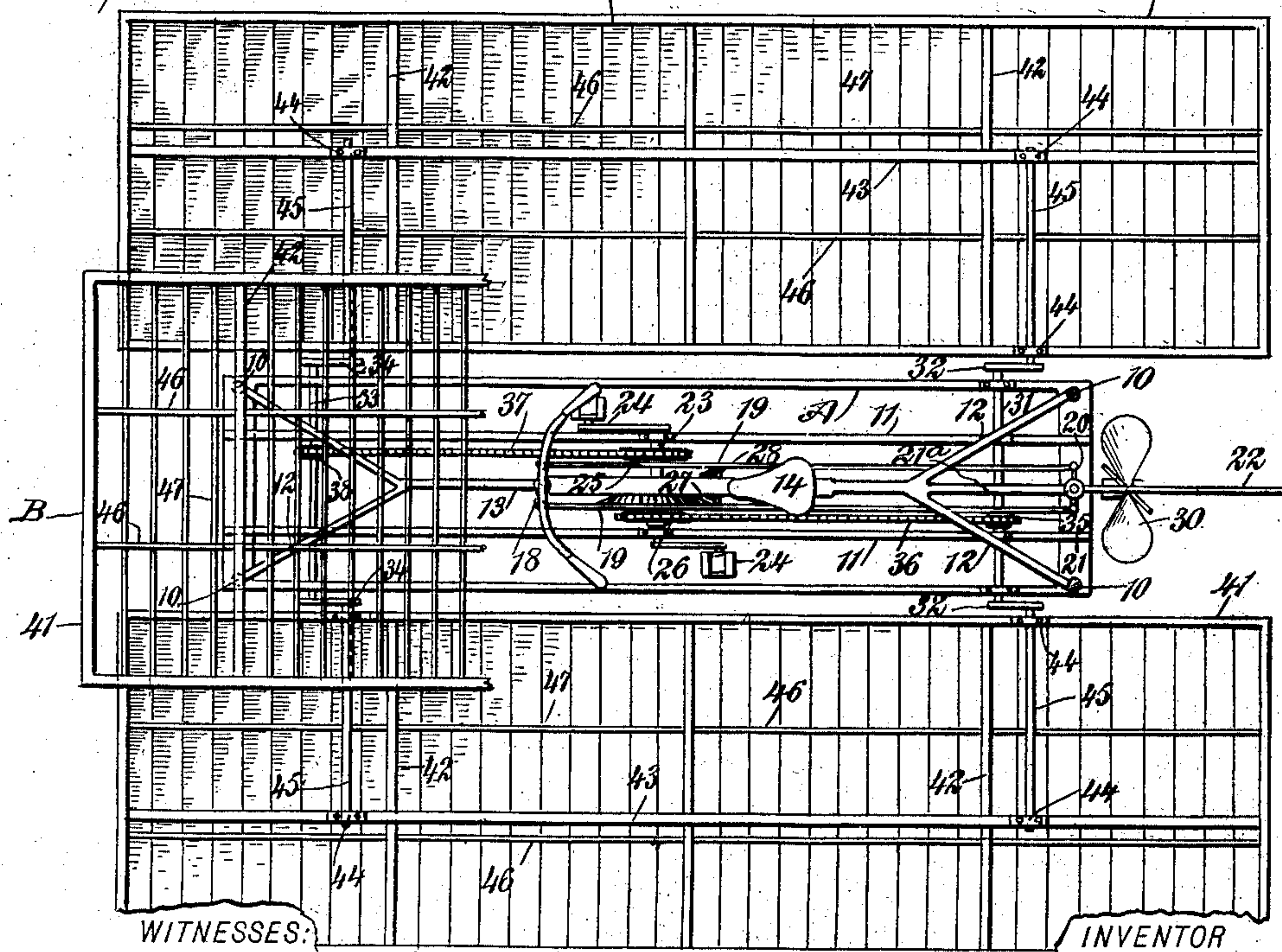
NO MODEL.

2 SHEETS—SHEET 1.

IIII



IIQZ



WITNESSES:

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MACHINE FOR AERIAL NAVIGATION.

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NO MODEL.

2 SHEETS—SHEET 2.

Fig 3

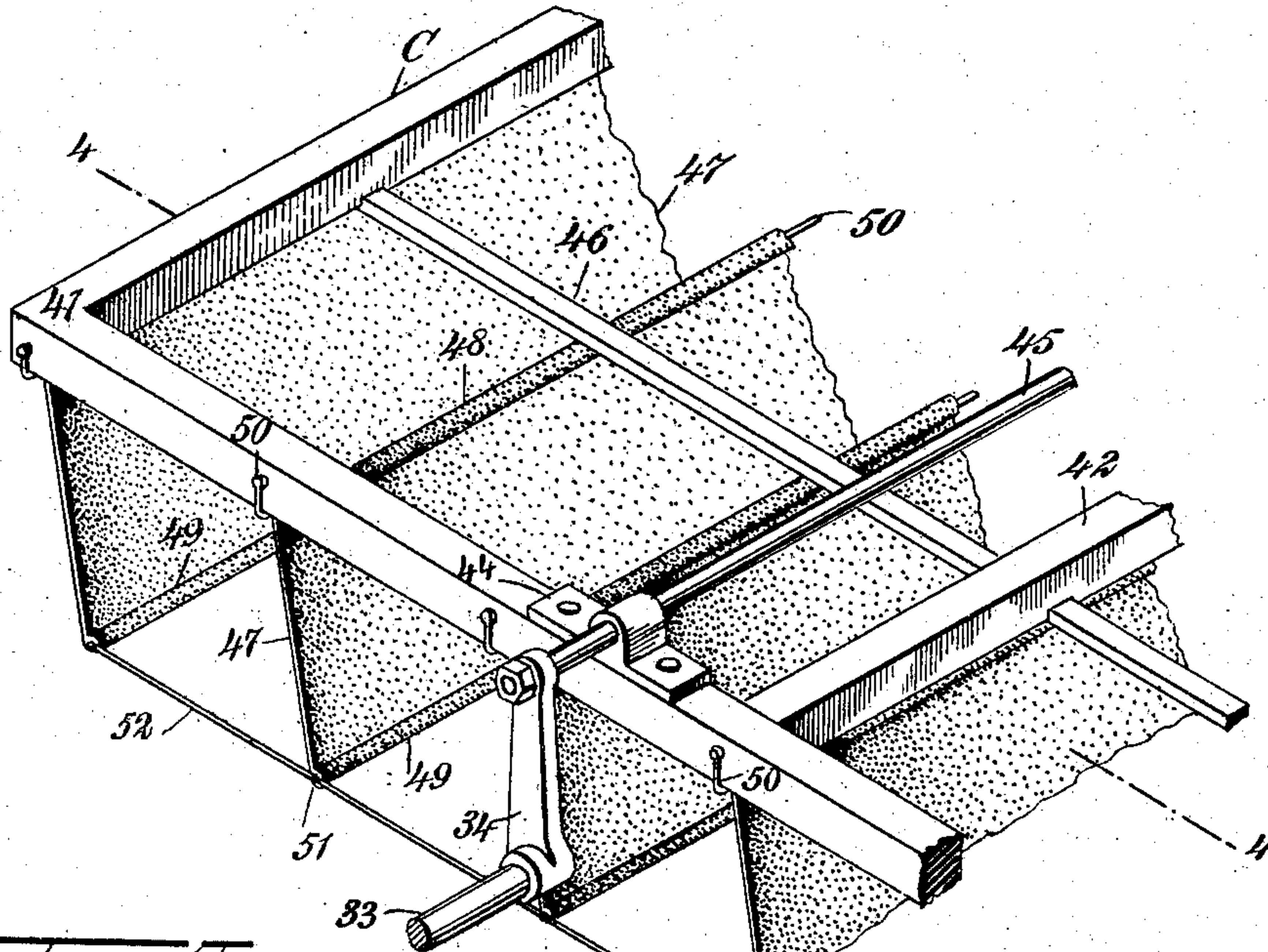


Fig 4

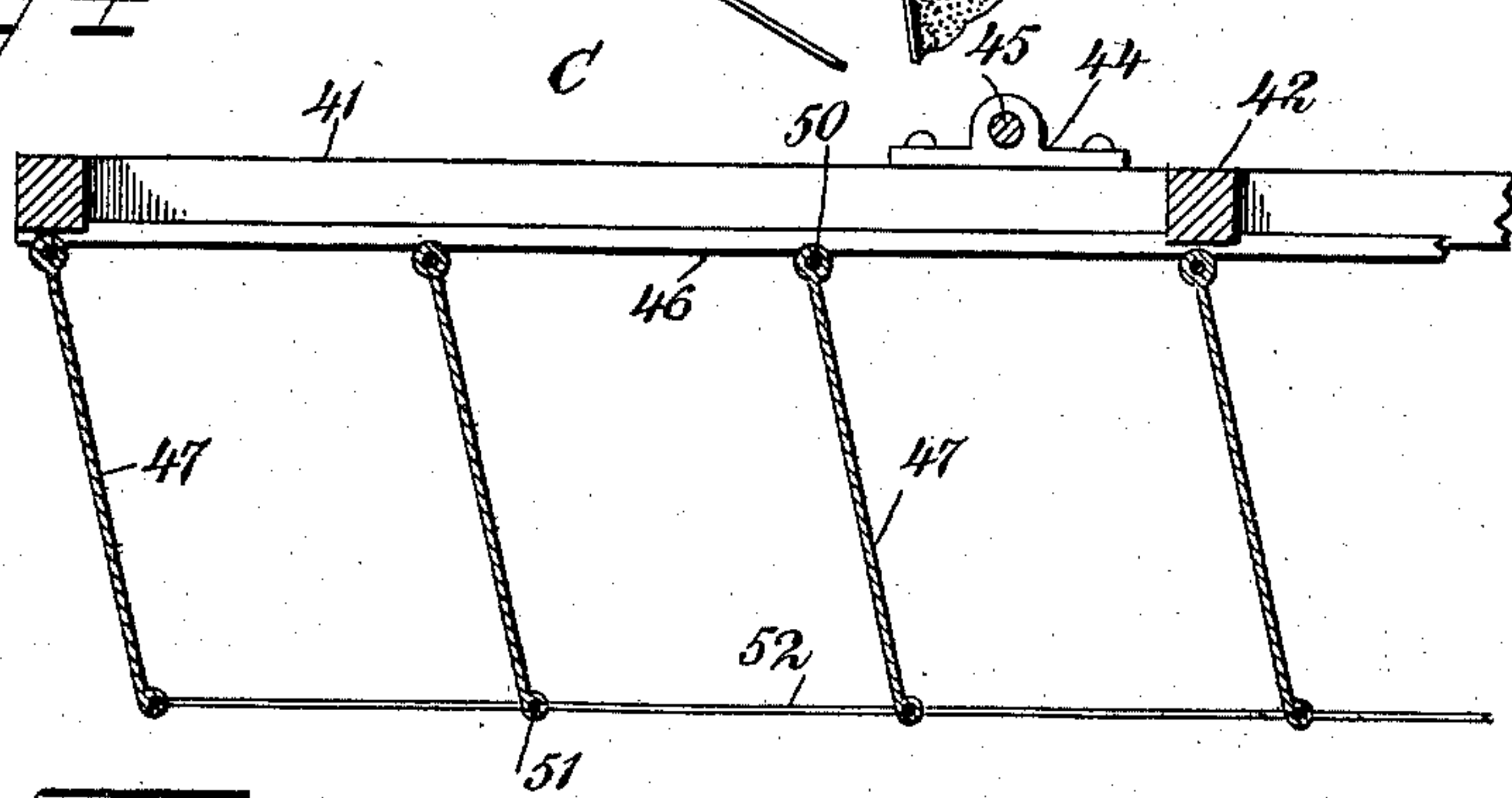
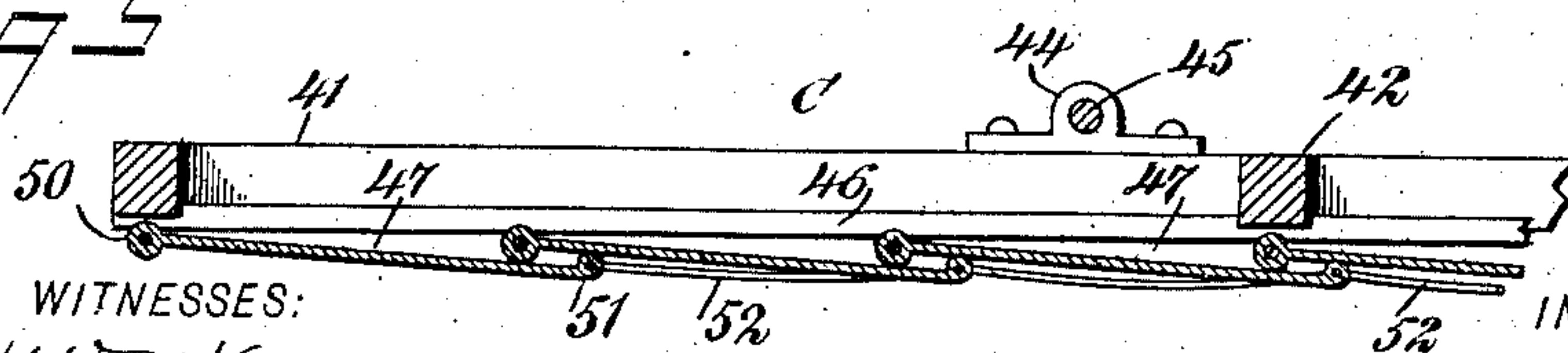


Fig 5



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UNITED STATES PATENT OFFICE.

ISAAC I. MORRIS, OF MELLETTTE, SOUTH DAKOTA.

MACHINE FOR AERIAL NAVIGATION.

SPECIFICATION forming part of Letters Patent No. 737,947, dated September 1, 1903.

Application filed July 15, 1902. Serial No. 115,679. (No model.)

To all whom it may concern:

Be it known that I, ISAAC I. MORRIS, a citizen of the United States, and a resident of Mellette, in the county of Spink and State of South Dakota, have invented a new and Improved Machine for Aerial Navigation, of which the following is a full, clear, and exact description.

The purpose of this invention is to provide a machine for aerial navigation which will be of simple and durable construction and effective in operation and in which a balloon-supported frame is employed provided with a motive power, including means for lifting and means for driving, and which also carries a steering device and wheels to support the structure when on the ground.

Another purpose of the invention is to provide a novel form of rotary wings used in connection with a fixed canopy-wing of like construction, all of the wings being provided with automatically-operating valves, the valves of the rotary wings opening at their upper strokes and closing at their downward strokes, while the valves of the fixed canopy-wing operate simultaneously with the rotary wings, but reversely, the valves of the canopy-wing opening when the valves of the side wings are closed upon their downward and lifting motion and closing when the side wings are on their upstroke to maintain an elevation acquired by the side wings during their downward stroke.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the improved aerial vessel. Fig. 2 is a horizontal section taken practically on the line 2 2 of Fig. 1. Fig. 3 is a perspective view of one of the side wings of the machine, showing the valves open. Fig. 4 is a section taken practically on the line 4 4 of Fig. 3, and Fig. 5 is a similar section showing the valves closed.

The main frame A of the machine is preferably rectangular, as is shown in Fig. 2. Uprights 10 extend from the sides of the main

frame at its ends to support a canopy B, to be hereinafter described. Longitudinal bars 11 are located at each side of the center of the frame A, as is also shown in Fig. 2, and converging brace-bars 12 are carried upward and inward from the ends of the main frame A to a connection with an upper central longitudinal bar 13, on which a seat 14 is secured, while in front of the seat a steering-post 16 is guided at its upper end in the bar 13, being mounted to turn at its lower end in a support 17 on the main frame.

At the upper end of the steering-post 16 handle-bars 15 are secured, and near the lower end of the said steering-post a cross-bar 18 is fastened, to the ends of which are secured ropes, chains, or cords 19, which ropes, chains, or cords are also fastened to the ends of a second cross-bar 20, secured upon a rudder-post 21, mounted to turn in the rear end of the frame A, being guided at the top by a brace 21^a, connected with the seat-carrying bar 13. Any suitable form of rudder 22 is secured to the said post 21.

A drive-shaft 23 is suitably journaled at the central portion of the frame A, having crank-arms and pedals 24 at its ends, and on the drive-shaft 23 two sprocket-wheels 25 and 26 are secured, and between them a bevel-gear 27 is attached to the drive-shaft. This gear 27 meshes with a bevel-pinion 28 on a shaft 29, extending in suitable bearings longitudinally of the main frame A to and beyond its rear end, at which portion of the frame A a propeller 30 is secured on the said shaft, adapted to force the machine ahead.

A shaft 31 is journaled transversely of the frame A near its rear end, having crank-arms 32 at its outer ends, and at the forward end of the main frame A a second transverse shaft 33 is journaled, carrying crank-arms 34 at its ends. The rear crank-shaft 31 is driven by placing a sprocket-wheel 35 on the said shaft 31 and connecting the sprocket-wheel 35 by a chain belt 36 with the sprocket-wheel 26 on the drive-shaft, and the forward crank-shaft 33 is simultaneously turned by a sprocket-wheel 38 on the said shaft and a chain belt 37, which is carried over the sprocket-wheel 38 to the wheel 25 on the drive-shaft 23.

In order to support the machine upon the ground, an auxiliary frame 39 extends down-

ward from the bottom of the main frame A, being provided near each end with suitably-mounted wheels 40, as is shown in Fig. 1.

The main feature of my invention relates to the means employed for lifting the machine in the air and maintaining it at the desired elevation from the earth's surface. Such means consist of two side wings C and C', arranged for rotary motion one at each side of the main frame, as is shown in Fig. 2, and an upper centrally-located canopy B, fixedly secured over the main frame. These wings and the canopy in all material points are of the same construction. Each side wing C and C' consists of a rectangular skeleton frame 41, made of any strong yet light material and having a series of cross-bars 42 and a longitudinal brace-bar 43, which bars are arranged to interlock with each other and are secured to the skeleton frame in any approved manner. The said skeleton frame and its braces are preferably flush at their top and bottom surfaces. Near each end of the skeleton frame 41 bearings 44 are secured in transverse alinement upon the upper face of the longitudinal brace-bar 43 and upon the corresponding face of the inner side bar of the skeleton frame, as is best shown in Fig. 2, and in the horizontally-alining bearings 44 shafts 45 are mounted to turn, which shafts at their inner ends are secured to the crank-arms 32 and 34 of the transverse shafts 31 and 33 on the main frame A, as is also shown in Fig. 2. The crank-arms 32 and 34 are arranged in parallelism, and as the shafts 31 and 33 are revolved the side wings are simultaneously and correspondingly moved up and down with a rotary motion.

On the under side of the skeleton frame 41 of each wing C and C' any necessary number of light longitudinal rods or strips 46 are secured, against which a series of valves 47 are adapted to close at the downward movement of the wings, said valves opening at the upward movement of the wings. These valves extend from side to side of the wings and are preferably made of canvas or other strong fabric, and in their closed position one valve overlaps another. Each valve 47 is provided with a hem 48 at its forward longitudinal edge, and wires 50, secured at their ends to the sides of the frame 41 of the wings, are passed through said hems 48, thus hinging the valves to the frames. It is desirable to prevent the valves when opened from moving farther forward than to the vertical position, as is shown in Figs. 3 and 4, in order that when the valves are in such position they will assist in the propulsion of the machine, as the currents of air will strike them. This is accomplished by forming hems 49 at the free longitudinal edges of the valves and passing wires 51 through said hems, which wires at their ends are connected by ropes 52 or other flexible members, which ropes cause all of the valves of a wing to operate in unison and when

suitably attached to the rear ends of the frames 41 successfully limit the forward and downward movement of the valves.

The canopy-wing B is alike in construction to that of the rotary wings and is stationarily held in a horizontal position over the main frame by attachment to the uprights 10, carried by the main frame A. A cigar-shaped balloon D is attached to the frame of the fixed canopy B to counterbalance the weight of the machine and its occupants and to assist in raising the same. As the driving mechanism is located partially within the main frame and partially below it, said mechanism constitutes ballast for the machine.

In the operation of the machine, when the wings C and C' press forward and down all their valves close automatically and form a solid or unbroken sheet, thus forcing the machine up. As the wings C and C' reach the limit of their downward course and start to move backward and up the valves of the wings automatically open, allowing the air to pass through, thus permitting the wings to rise for the next downstroke with comparatively no resistance. When the rotary wings C and C' make their downstroke to raise the machine, all the valves in the canopy B are opened, whereby to offer no resistance to the upward movement of the machine; but the moment the force of the stroke of the wings is exhausted the valves in the canopy automatically close and form a solid or unbroken sheet to hold the machine steady, while the wings C and C' pass backward and up for the next working stroke.

I desire it to be understood that the wings may be braced or strengthened by suitable truss-rods where needed and that instead of manual power mechanical power may be employed.

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

1. In a machine for aerial navigation, a frame, a pedal-operated driving mechanism carried by the frame, a horizontal wing at each side of the frame, extending from end to end thereof and connected with the driving mechanism, each wing having a rotary reciprocating motion in a vertical direction, and a horizontal canopy in one section, stationarily mounted above the frame and extending partly over the side wings, each wing and said canopy consisting of a skeleton frame and pivoted valves arranged to open and close and to overlap in their closed position, the valves of the canopy simultaneously closing when the valves of the side wings are opened, substantially as described.

2. In a machine for aerial navigation, a lifting-wing adapted to be rotated with an up-and-down movement, which wing consists of a skeleton frame and valves horizontally arranged in the frame, having one edge hinged to the frame in a forward position relative to the opposing free edges, said valves when

closing having upward movement in a rearward direction, one valve overlapping the other in their closed position, connecting-rods for the valves, and crank-arms having connection with the said frame whereby through the movement of the frame to automatically operate the said valves, substantially as described.

3. In a machine for aerial navigation, a lifting-wing adapted to be rotated with an up-and-down movement, which wing consists of a skeleton frame and valves having one edge hinged to the frame in a forward position relative to the opposing free edges, the said valves when closing having an upward movement in a rearward direction, one valve overlapping the other in their closed position, devices for limiting the movement of the valves in a forward direction in opening, connecting-rods for the valves, crank-shafts in operative engagement with the frame, a balloon-supported frame, and a motor carried by the frame, having driving connection with the said crank-shafts, as and for the purpose described.

4. The combination with a balloon-supported frame, a manually-operated driving mechanism carried by the frame, shafts rotated

from said mechanism and carried by the frame, and cranks at the terminals of the shafts, of a wing mounted to rotate with vertical movement at each side of the frame through the medium of said shafts, and a horizontal canopy-wing fixedly held above the frame and operated by the atmosphere through which the device passes, each wing consisting of a skeleton frame, valves hinged to the frame, arranged to open downwardly and forwardly and to close upwardly and rearwardly with overlapping engagement, and shafts journaled upon the side wings and connected with the cranks of the frame-shafts, a steering device, means for manually operating the same, and a propelling device operated by the said driving mechanism, the wings being adapted to control the vertical movement of the machine, as set forth.

In testimony whereof I have signed my name to this specification in the presence of the subscribing witnesses.

ISAAC I. MORRIS.

Witnesses:

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WM. BECKMAN,
W. E. COLE.