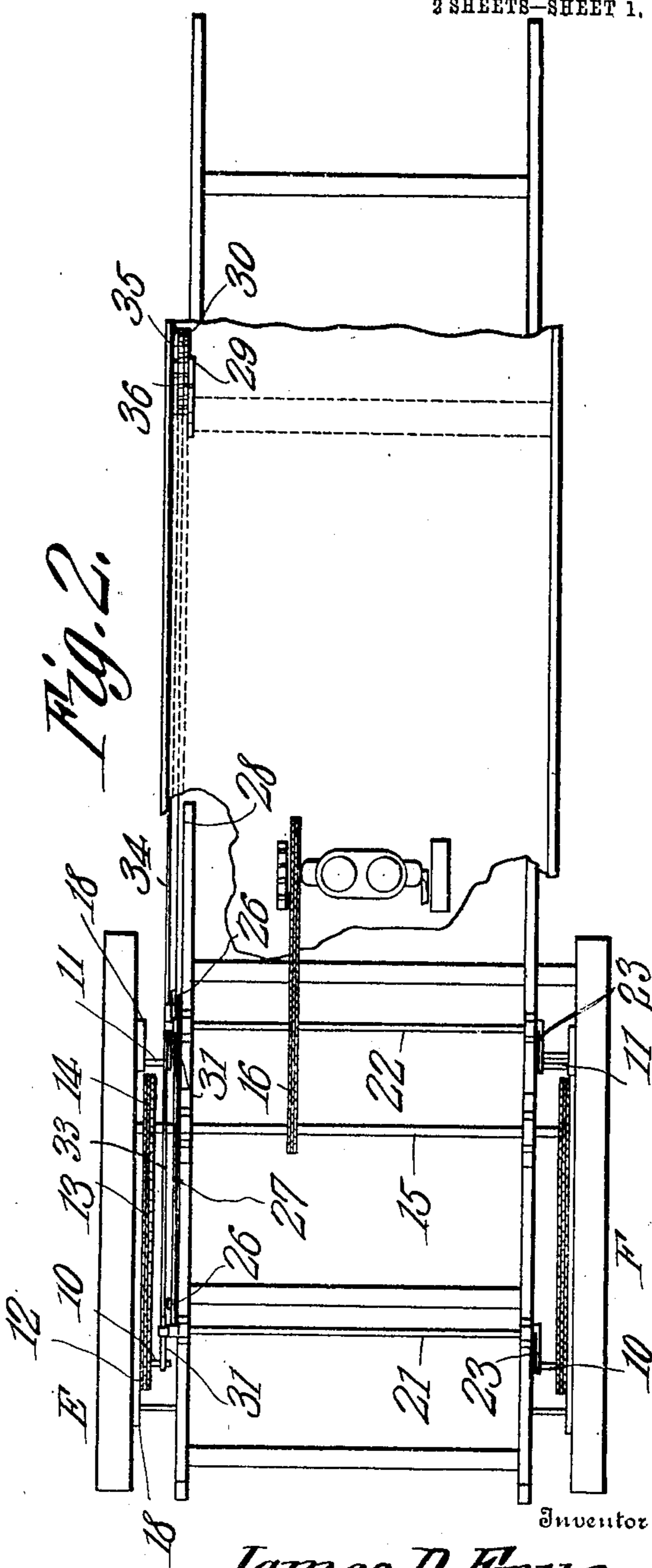
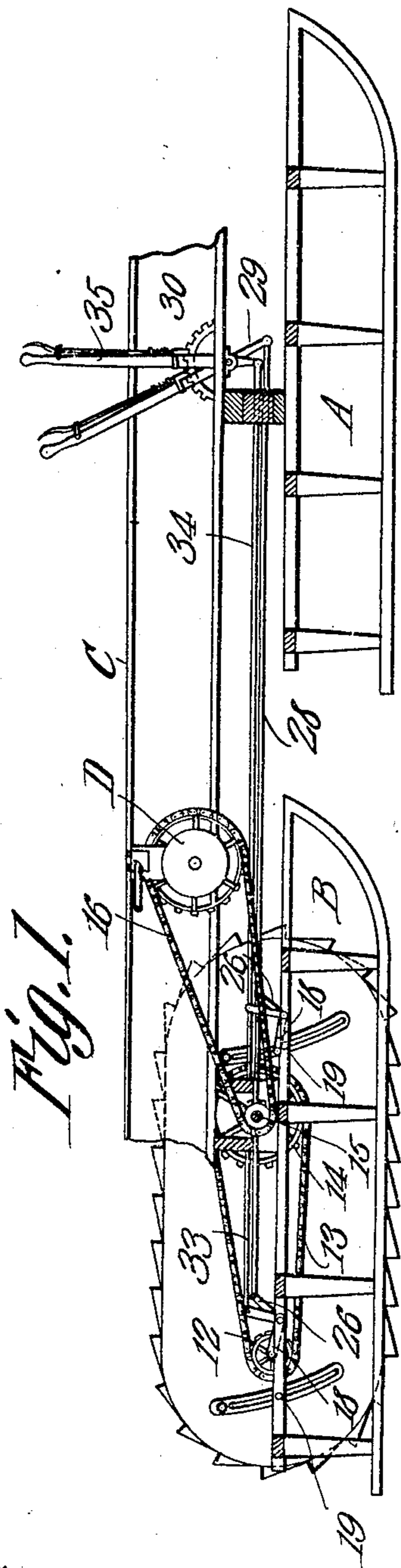


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SLEIGH PROPELLING MECHANISM.  
APPLICATION FILED JULY 17, 1908.

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Patented Apr. 13, 1909.

2 SHEETS—SHEET 1.



Witnesses

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By

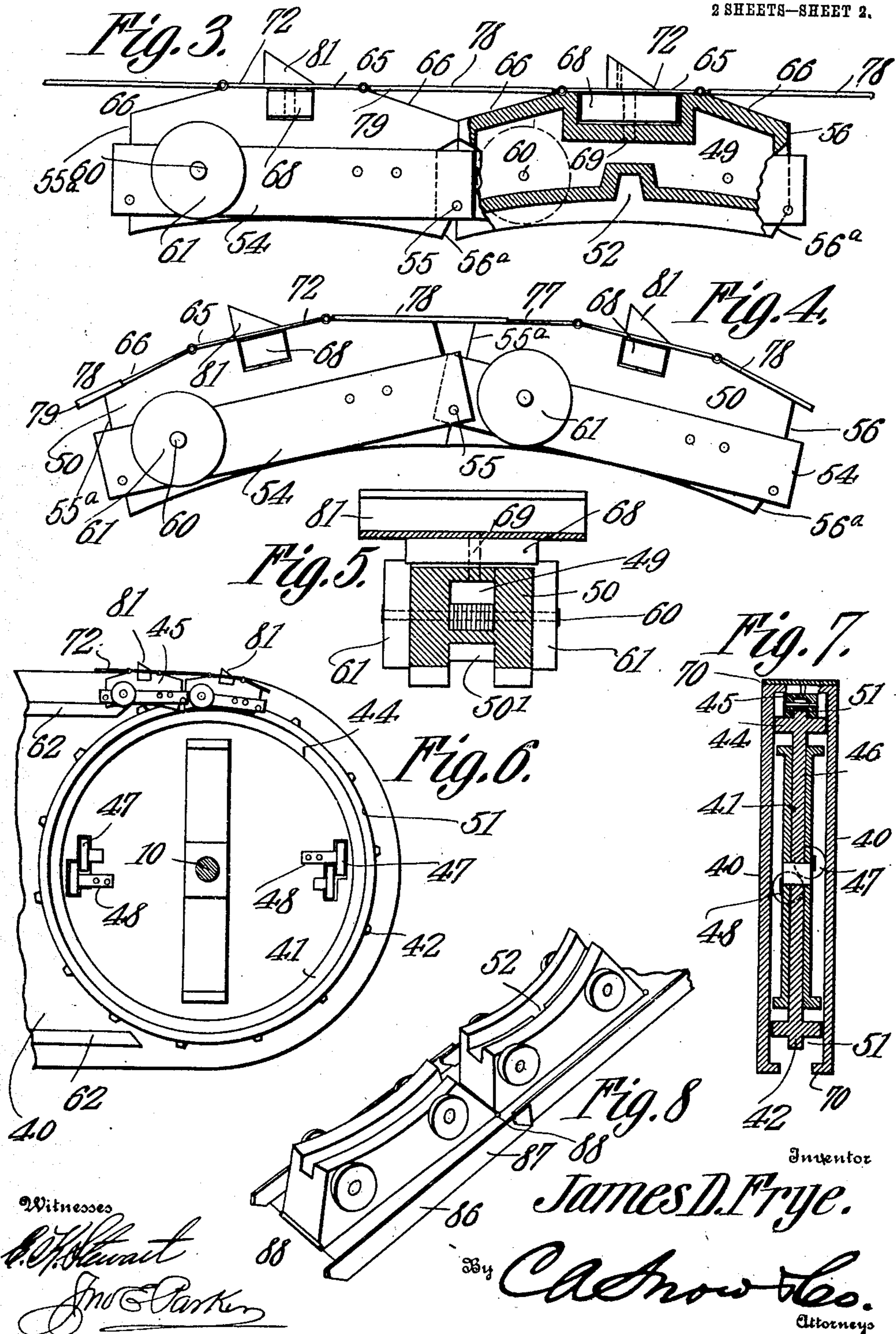
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James D. Frye.  
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# UNITED STATES PATENT OFFICE.

JAMES DAVID FRYE, OF ST. JOHNSBURY, VERMONT, ASSIGNOR OF ONE-THIRD TO LEONARD A. STUART, OF ST. JOHNSBURY, VERMONT.

## SLEIGH-PROPELLING MECHANISM.

No. 918,431.

Specification of Letters Patent.

Patented April 13, 1909.

Application filed July 17, 1908. Serial No. 443,995.

*To all whom it may concern:*

Be it known that I, JAMES DAVID FRYE, a citizen of the United States, residing at St. Johnsbury, in the county of Caledonia and State of Vermont, have invented a new and useful Sleigh-Propelling Mechanism, of which the following is a specification.

This invention relates to propelling devices for sleighs and has for its principal object to provide a mechanism of simple construction which may be readily mounted on a sleigh and employed for propelling same over snow or ice.

A further object of the invention is to provide a propelling means at each side of the sleigh and to so arrange the propelling means as to permit independent adjustment of either of them to operative or inoperative position.

A still further object of the invention is to provide a novel form of propelling device in which a series of shoes are pivotally connected together in the form of an endless chain and mounted on a pair of carrying wheels. The lower run of the chain remaining in contact with the ground and affording an extensive traction service the effect of which may be augmented by the employment of pointed calks or like members on each of the shoes.

A still further object of the invention is to provide the shoes with treads that are so constructed and connected as to present a continuous surface that will prevent the entrance of snow or ice, and which will preserve the continuity of the propelling device as the shoes close together in traveling around the periphery of the wheels and open out in passing between said wheels.

A still further object of the invention is to provide shoe guiding means between the wheels and to employ on each shoe a plurality of anti-friction rollers adapted to engage said guides.

A still further object of the invention is to make the shoes self-oiling, the shoes being hollow and constituting a lubricant containing reservoir from which the lubricant may flow to the journals of the anti-friction rollers.

With these and other objects in view, as will more fully hereinafter appear, the in-

vention consists in the novel construction and arrangement of parts, hereinafter fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportion, size and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings:—Figure 1 is a longitudinal section view of a sleigh provided with a propelling means constructed in accordance with the invention. Fig. 2 is a plan view of the same. Fig. 3 is a detail view showing one of the shoes in section and the position the parts assume when the shoes are moving in a straight line. Fig. 4 is a side elevation of the positions assumed by a pair of connected shoes when traveling around the periphery of one of the guiding or driving wheels. Fig. 5 is a transverse section on the line 5—5 of Fig. 3 of one of the shoes. Fig. 6 is a side elevation of one of the driving wheels showing also a pair of connecting shoes. Fig. 7 is a transverse section view of same on the line 7—7 Fig. 6. Fig. 8 is a detail perspective view of a pair of shoes and treads illustrating a slightly modified construction.

The sleigh shown in the drawing is of the type generally known as a bob sleigh comprising small sled frames A and B upon which is mounted an operating frame C arranged to carry the load and on this upper frame is a motor D which may be in the form of an internal combustion engine, an electric motor, or the like.

Arranged at each side of the rear sled B are the propellers designated generally E and F each being in the form of an incased frame provided with bearings for the reception of a pair of shafts 10 and 11. Each of the rear shafts 10 carries a sprocket wheel 12 that is connected by a link-belt 13 to a sprocket wheel 14 on a countershaft 15 that is journaled in the main frame, and is operatively connected to the shaft of the motor by suitable sprocket wheels and a link-belt 16.

The propellers E and F may be raised or lowered independently of each other and

each is held from lateral play by links 18 which are pivoted to the inner sides of the propeller casings, the links being slotted for the passage of bolts 19 that extend 5 through openings formed in the frame of the sled B. Extending transversely of the frame of the sled B are two small rocker shafts 21 and 22, and at the ends of the rocker shafts adjacent the propeller F are secured rocker 10 arms 23 in which the inner ends of the shafts 10 and 11 are journaled so that if these rocker shafts are turned in one direction the propeller F will be elevated to inoperative position, and if turned in the other direction 15 the propeller will be lowered until its traction shoes engage the snow or ice. At one end of the rocker shafts are secured arms 26 which are connected together by a long link 27 and from the forward arm extends a rod 20 28 that is connected to the lower ends of an operating lever 29, said lever carrying a latch bolt of ordinary construction arranged to engage in the notches of a locking quadrant 30. This lever is arranged within convenient 25 reach of an operator and by manipulating it the propeller F may be raised or lowered and locked in the position to which it is adjusted.

Mounted loosely on the rocker shafts 21 and 22 adjacent the propeller E are bell- 30 crank levers 31 the approximately horizontal arms of which are provided with bearings for the reception of the inner ends of the shafts 10 and 11 of said propeller. The approximately vertical arms of said bell-crank levers 35 are connected together by a long link 33 and extending from the vertical arm of the forward lever is a rod 34 that is connected to the lower end of a lever 35 that is provided with 40 a latch bolt arranged to engage the notches of a locking quadrant 36, so that by manipulating the lever 35 the propeller E may be raised or lowered and locked in adjusted position.

Each of the propellers comprises a pair of 45 side plates 40 provided with suitable bearings for the reception of the two shafts 10 and 11. The shaft 10 carries a driving wheel 41 that is provided with sprocket teeth 42 arranged to engage and impart motion to the 50 shoes. The shaft 11 carries a guiding wheel which may be toothed or not, its function being merely to serve as a guide for the forward end of the propelling chain.

Each of the wheels is provided with a wide 55 rim 44 for the reception of the shoes 45 and the central web 46 of each sprocket is provided with openings for the passage of anti-friction rollers 47 that are journaled in small bearing blocks 48 carried by the opposite 60 sides of the web, these rollers being arranged to engage the inner surfaces of the side plates 40 and thus hold the wheel from lateral play without undue friction.

Each shoe is in the form of an elongated

block the interior of which is hollowed out to 65 form a chamber 49 for the reception of lubricating material, and one side 50 of the block is removable so that the lubricant may be renewed from time to time. The inner face of each block is concaved longitudinally to conform to the periphery of the propelling and 70 guiding wheel, and is further provided with a longitudinal groove 57 that is arranged to receive a continuous annular rib 51 on the periphery of each of the wheels, this rib and 75 groove connection preventing lateral displacement of the shoes. The inner face of each shoe is further provided with a recess 52 arranged for the reception of a sprocket tooth so that driving movement may be im- 80 parted from the wheel 41 to the shoes.

On each side of the shoes are plates 54 that project beyond the ends of the shoes and overlap. These plates are provided with openings for the reception of pivot pins 55 85 which serve to connect the shoes in the form of an endless chain. One of the ends of each shoe has a straight face 55<sup>a</sup>, and the other end of each shoe is provided with two angularly disposed faces, indicated at 56 and 90 56<sup>a</sup>, respectively. The face 56 is in a plane at right angles to the general longitudinal axis of the shoe, while the face 56<sup>a</sup> is arranged on a radial line connecting the axis of the wheel-carrying shaft to the axis of the pivot 95 pin. By this construction, when the shoes are traveling around the periphery of the wheel, the faces 56<sup>a</sup> contact with the faces 55<sup>a</sup> of the adjacent shoes, as shown in Fig. 4, and when traveling in a straight line between 100 the two wheels, the faces 56 will engage the faces 55<sup>a</sup>, as shown in Fig. 3.

Extending transversely through each of the shoes and passing through the lubricant containing chamber thereof are two shafts 105 60 that carry anti-friction rollers 61 adapted to bear on the peripheries of the wheels, and in the intervals between the two wheels these rollers engage fixed guiding tracks 62 that are carried by the inner faces of the casing 110 members 40. As the shafts pass through the lubricant containing chambers they will at all times be effectually lubricated.

The outer face of each shoe is arranged on three angular lines, the central face 65 of 115 which is a plane parallel with the general longitudinal plane of the shoe or in a line at a right angle to a line radiating from the axis of the wheel shaft. The other faces 66 are disposed at obtuse angles to the face 65, 120 gradually tapering toward the ends of the shoe.

The central face 65 of the shoe is provided with a transversely disposed recess for the reception of an anti-friction roller 68 that is 125 mounted on a stud 69, and the diameter of this roller is greater than the width of the shoe, so that the two exposed edges of the

roller will engage the inturned flanges 70 that are formed at the edges of the covering plates 40 of the propellers.

To the outer face of each shoe is secured a tread plate 72 that preferably is secured to the outer end of a stud 69. The length of the said plate is practically the same as the length of the flat surface 65 and to the opposite ends of said plate are hinged auxiliary plates 77 and 78, the plate 77 being in the form of a plane sheet of metal, while the plate 78 is provided at each edge with a turned flange 79, the flanged-plate of each shoe receiving the plane plate of the next adjacent shoe thus forming a continuous surface that will accommodate itself to the path of movement of the shoes, the tread straightening out when the shoes are moving between the two wheels as shown in Fig. 3, and closing together when the shoes are traveling around the wheel as shown in Fig. 4. Secured to each of the treads is a calk 81 that preferably is pointed or provided with a sharp edge for engagement with the smooth surface of snow or ice.

In Fig. 8 is illustrated a slightly modified construction of shoe and tread in which the shoe members are provided with treads 86 that have edge flanges 87 arranged to overlap and thus present a continuous side guard to prevent the entrance of snow or ice. The tread members 86 are hingedly connected together at 88 and the ends of the shoes in this case are arranged on angular lines that radiate from the center of the wheel carrying shaft. The upper rim of the chain may be inclosed by a suitable guard of any construction, this being omitted in the drawing.

I claim:—

1. In a propeller of the class described, a plurality of shoes pivotally connected to form an endless chain, means for guiding and driving said chain, and tread members secured to the shoes, each tread member comprising a central section and a section pivoted to each end thereof, the end sections of adjacent tread members being slidably connected and arranged to form a continuous tread surface.

2. In a propeller of the class described, a plurality of shoes pivotally connected together to form an endless chain, a pair of spaced guiding and driving wheels around which said chain passes, one of the ends of the shoes having a straight face, and the other ends of the shoes being each provided with two surfaces at an oblique angle to each other, the innermost surfaces of adjacent shoes abutting as the shoes pass around the wheels, and the outermost surfaces abutting as the chain travels in a straight line between the wheels.

3. In a propeller of the class described, a plurality of shoes pivotally connected to-

gether to form an endless chain, guiding and driving wheels around which the chain passes, fixed guides between said wheels, and a plurality of anti-friction rollers carried by each shoe and having their axes at right angles to each other, said rollers being arranged to engage with the guides.

4. In a propeller of the class described, a plurality of shoes pivotally connected to form an endless chain, guiding and driving wheels around which the chain passes, a fixed frame having inturned flanges surrounding the wheels and chain and through which the edges of the shoes project, and anti-friction rollers carried by the shoes and projecting beyond each side thereof for engaging with the edge portions of said flanges.

5. In a propeller of the class described, a plurality of shoes pivotally connected to form an endless chain, guiding and driving wheels for the chain, each of the shoes being provided with a longitudinal slot or groove in its inner face and the wheels having peripherally disposed ribs fitting within said slots or grooves, a casing surrounding the wheels and chain, and anti-friction rollers carried by the shoes and bearing against the opposing surfaces of the casing and wheels.

6. In a propeller of the class described, a plurality of shoes pivotally connected to form an endless chain, the outer surface of each shoe being recessed, an anti-friction roller mounted within the recess, a stud carrying said anti-friction roller, a fixed guide with which the rollers engage, and a tread carried by the stud and forming a traction surface.

7. In a propeller of the class described, a plurality of shoes pivotally connected to form an endless chain, each of the shoes being hollow and forming a lubricant containing chamber, shafts extending through the shoes, anti-friction rollers carried by the shafts at points outside the shoes, and guiding members with which said rollers engage.

8. In a propeller of the class described, a plurality of shoes pivotally connected to form an endless chain, means for guiding and driving said shoes, the outer surface of each shoe having angularly related faces, a tread secured to the outer face of each shoe and comprising a central member arranged to bear against the central face of the shoes, and pivotally connected flaps arranged to bear against the angular faces thereof, and calks secured to the central section of the tread.

9. The combination with a sleigh of a driven shaft, a pair of propelling devices arranged at opposite sides of the sleigh and each including a pair of spaced shafts, a pair of rocking shafts extending transversely of the sleigh frame, rocker arms secured to one end of the shafts and forming bearings for the reception of the shafts of one of the pro-

pellers, means for rocking said shafts to raise  
and lower the propeller, a pair of connected  
bell-crank levers loosely mounted on oppo-  
site ends of the rocker shafts and connected  
5 to the shafts of the other propeller, and  
means for actuating said bell-crank levers.  
In testimony that I claim the foregoing as

my own, I have hereto affixed my signature  
in the presence of two witnesses.

JAMES DAVID FRYE.

Witnesses:

HAROLD O. FRENCH,  
S. J. SOMERVILLE.