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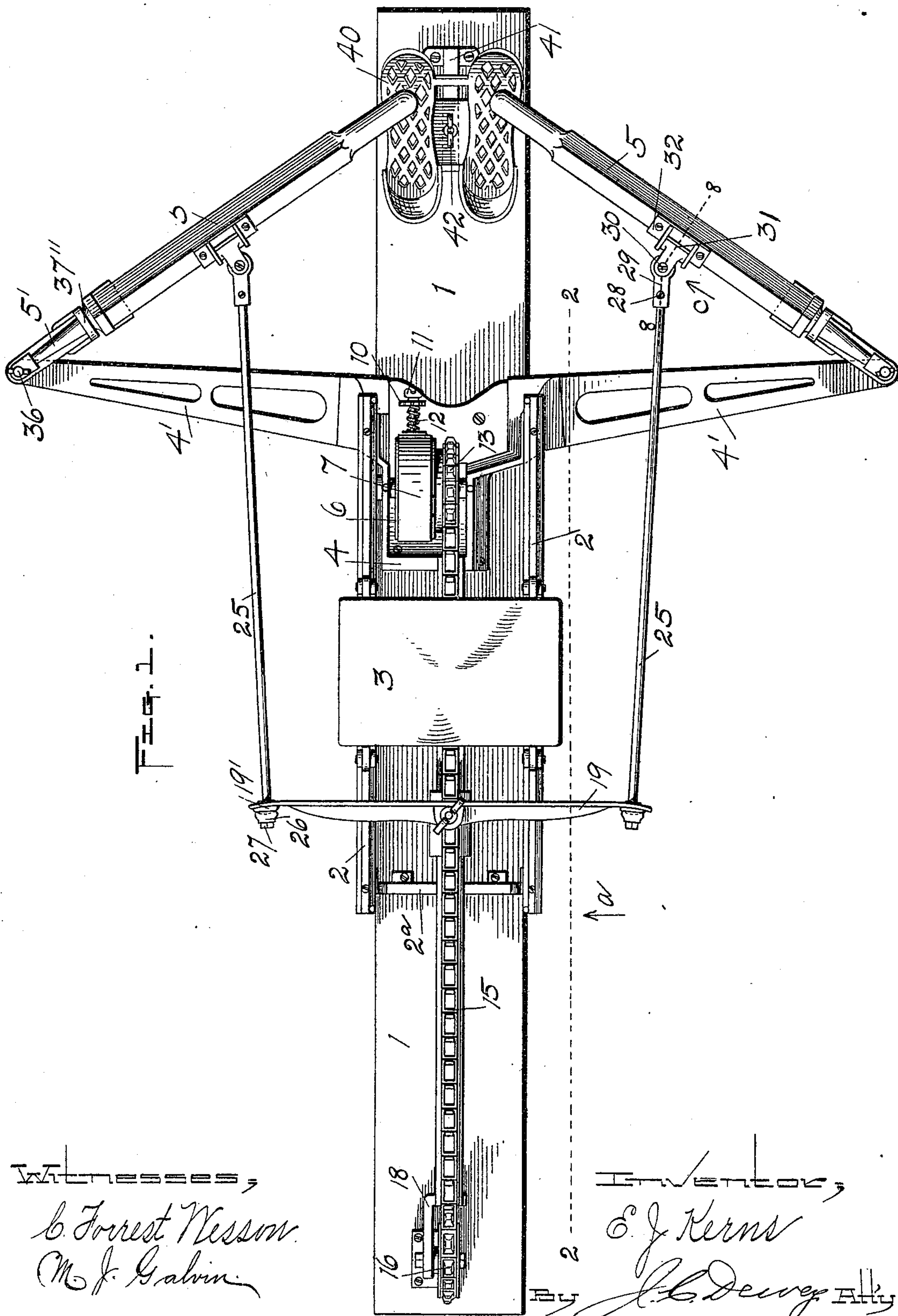
Patented Jan: 16, 1900.

E. J. KERNS.
ROWING MACHINE.

(Application filed Mar. 8, 1899.)

(No Model.)

4 Sheets—Sheet 1.



Witnesses,
C. Forrest Nesson.
M. J. Galvin

Inventor,
C. J. Kerns
C. B. Dewey, Atty.

No. 641,596.

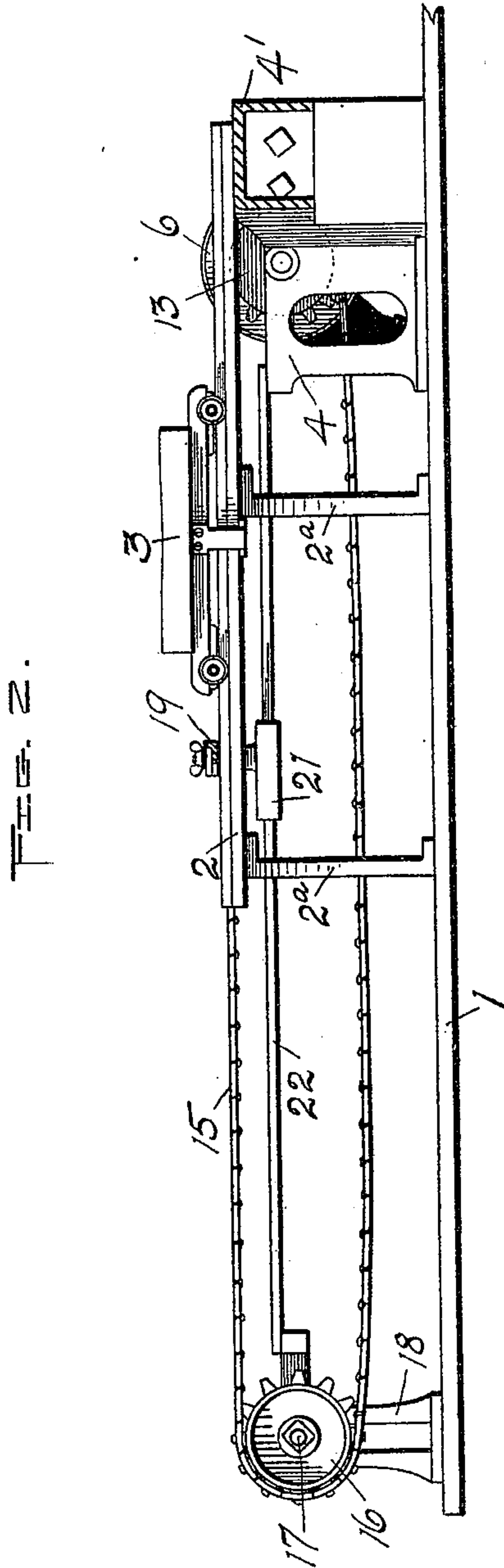
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M. J. Galvin.

Inventor,

E. J. Kerns.

By J. P. Dewey.

Atty

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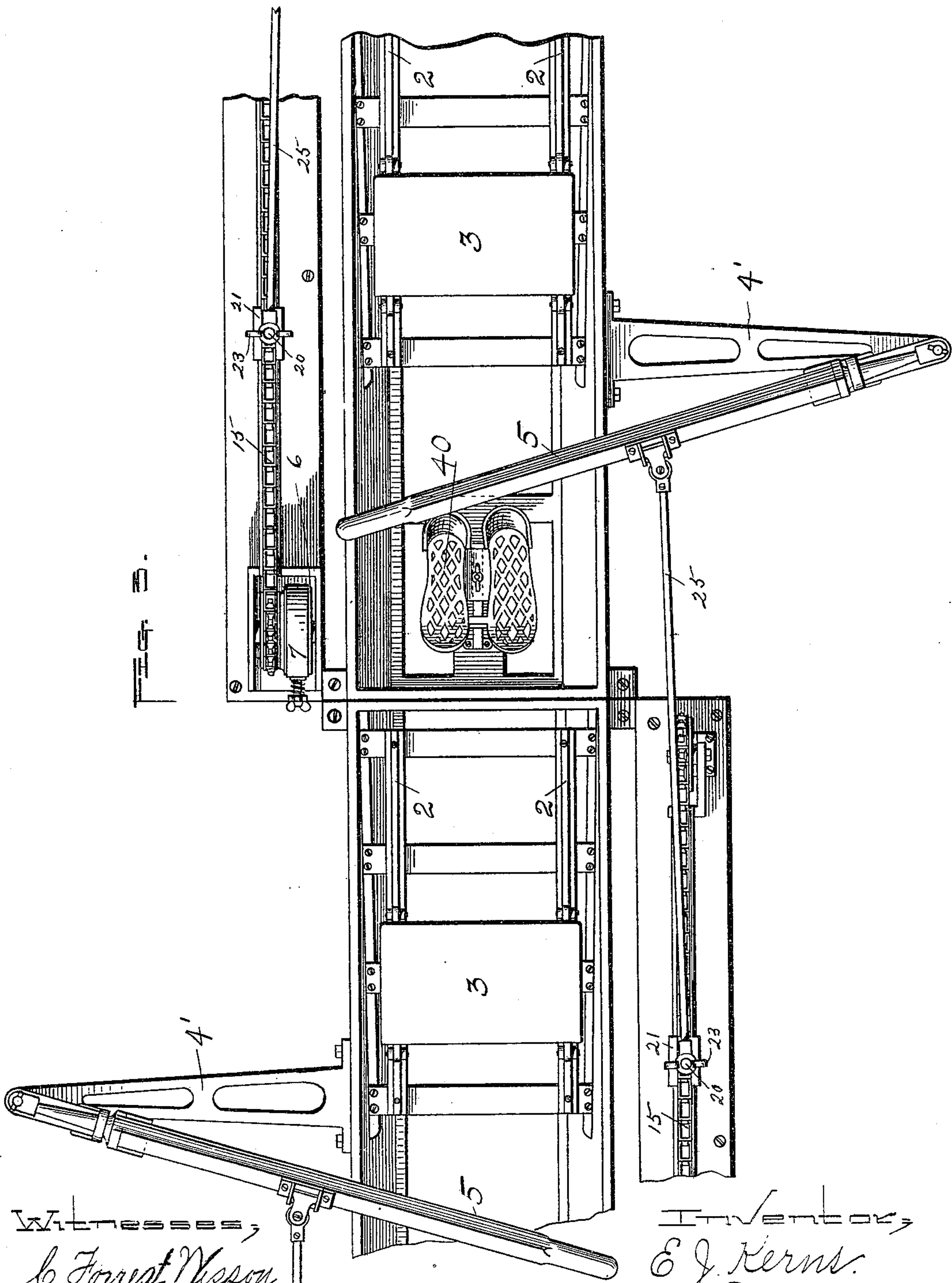
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M. J. Galvin

Inventor,
E. J. Kerns.
By J. C. Dewey Atty.

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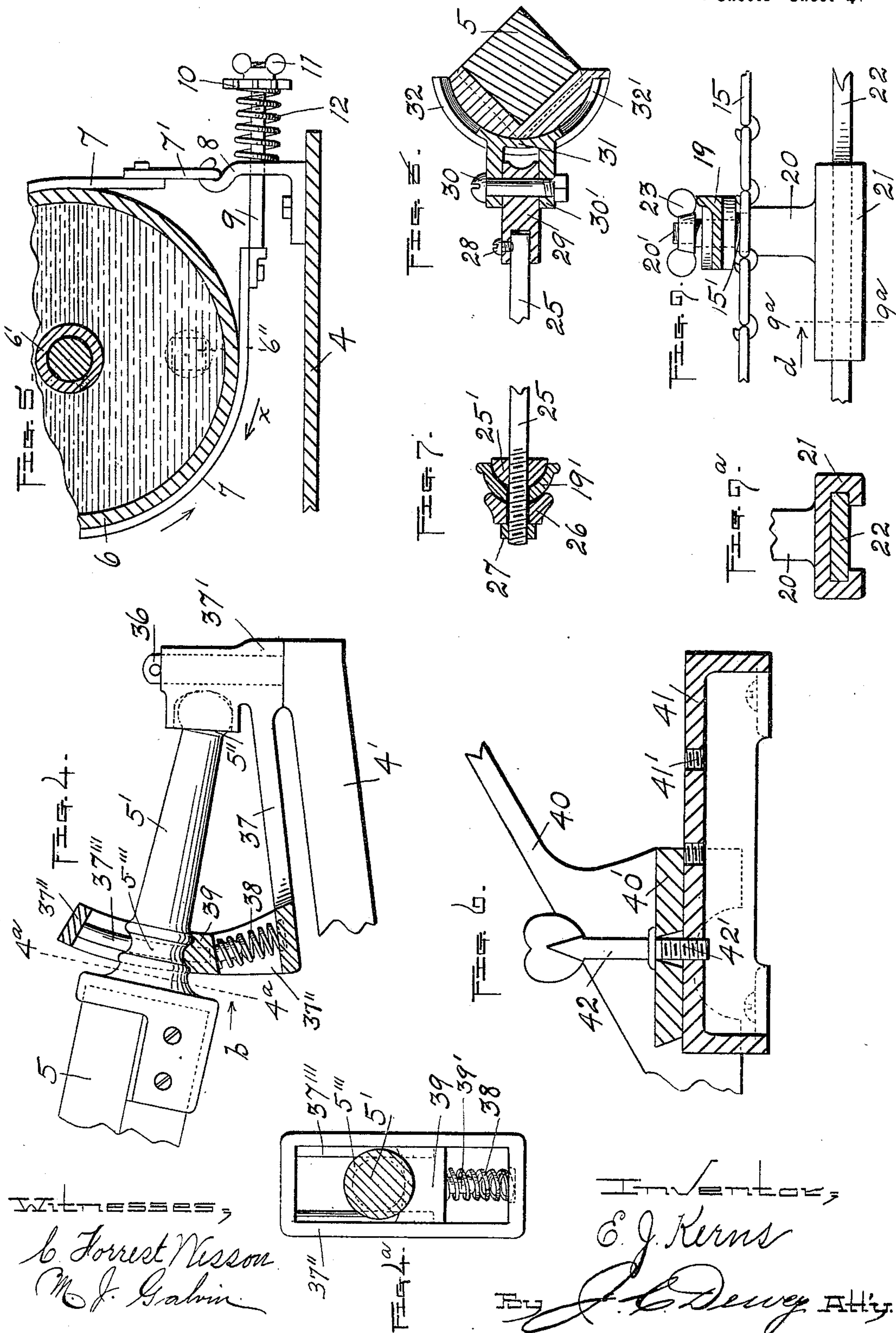
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4 Sheets—Sheet 4.



UNITED STATES PATENT OFFICE.

EDWARD J. KERNS, OF WORCESTER, MASSACHUSETTS.

ROWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 641,596, dated January 16, 1900.

Application filed March 8, 1899. Serial No. 708,182. (No model.)

To all whom it may concern:

Be it known that I, EDWARD J. KERNS, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Rowing-Machines, of which the following is a specification.

My invention relates to rowing-machines and to that class of machines shown and described in my United States Patent No. 435,934; and the object of my invention is to make an improved rowing-machine in which the whole oar is made to rotate to imitate "feathering" and the foot-rests are made adjustable and the connections between the oars and the friction operating mechanism are made so as to avoid any friction of parts and the friction mechanism itself is simplified.

My invention consists in certain novel features of construction of my rowing-machine, as will be hereinafter fully described.

My improvements in rowing-machines may be embodied in a single machine to be used by one person, as a single boat, or in a number of machines used together, as a two, four, six, or eight oar boat.

Referring to the drawings, Figure 1 is a plan view of a single rowing-machine embodying my improvements. Fig. 2 is a side view of a portion of the machine shown in Fig. 1, taken at a point indicated by line 2 2 in said figure, looking in the direction of arrow *a*. Fig. 3 shows my improvements applied to a plurality of rowing-machines to be used together. Fig. 4 is a detail showing the manner of pivotally attaching the end of the oar. Fig. 4^a is a section on line 4^a 4^a, Fig. 4, looking in the direction of arrow *b*, same figure, showing the slotted stand for the oar. Fig. 5 is a sectional detail of the friction mechanism. Fig. 6 is a sectional detail showing the manner of adjustment of the foot-rests. Fig. 7 is a sectional detail of the end of the connector-rod attached to the transverse bar. Fig. 8 is a cross-section through the oar, taken at a point indicated by line 8 8, Fig. 1, looking in the direction of arrow *c*, same figure, showing the manner of attaching the oar to the connector-rod, so that the same may have a rotary motion. Fig. 9 is a detail showing the manner of attaching the transverse bar to the endless chain; and Fig.

9^a is a section on line 9^a 9^a, Fig. 9, looking in the direction of arrow *d*, same figure. Figs. 4 to 9^a, inclusive, are shown on an enlarged scale.

In the accompanying drawings, 1 is a plank or heavy board forming the base of my machine, upon which the several parts are mounted.

2 2 are tracks secured upon stands 2^a 2^a and casting 4 above the base 1, upon which the roller-seat 3 is supported and travels in the ordinary way. A metal frame or casting 4 is secured to the base 1 and has the oppositely-extending arms or outriggers 4', to the outer ends of which are pivotally connected the oars 5, to be hereinafter described.

Upon the central portion of the metal frame or casting 4 is mounted the friction mechanism by means of which the strength required to work the oars is regulated. The friction mechanism consists in this instance of a pulley 6, loosely mounted on a shaft fast in bearings on the metal frame 4. A belt 7 extends around said pulley and is connected at one end by means of a link 7' to a stationary hook-stand 8, bolted to the base of the casting 4, as shown in Fig. 5. The opposite end of the belt 7 has secured thereto a pin or bar 9, which extends loosely through an opening in the hook-stand 8 and is provided with a screw-thread on its outer end, upon which there are a nut 10 and a check or thumb nut 11. Intermediate the nut 10 and the hook-stand 8 is a compressible spiral spring 12. By turning the nut 10 and thumb-nut 11 on or off of the screw-threaded end of the pin 9 the belt 7, extending around the pulley 6, is tightened or loosened to increase or decrease the friction thereon, as desired. The compressible spring 12 acts to take up any stretch in the belt 7 and also releases the belt instantly, when the pulley 6 revolves in the opposite direction (indicated by arrow *x*) on the recovery of the oars, so that there is no friction or tension on the pulley. This is an important feature in the construction and operation of my friction mechanism.

The pulley 6 is preferably made chambered or provided with a reservoir around its hub 6' to hold oil or lubricating material, as shown in Fig. 5, to prevent the pulley from becoming too heated. The oil may be introduced

through a hole closed by a plug, as indicated by dotted lines 6'', Fig. 5.

Extending out from one side of the pulley 6 and secured thereto or made integral therewith is a sprocket-wheel 13, around which passes an endless chain 15 to a second sprocket-wheel 16, loose on a stud 17, adjustable in a stand 18, secured to the base 1, as shown in Fig. 2. By adjusting the stud 17 any slack in the chain 15 may be taken up and the proper tension maintained.

Connected with the endless chain 15 is a whiffletree or transverse bar 19. The bar 19 has an opening through its central portion, through which extends the stud or pin 20' on the upper end of the post 20, which is fast at its lower end on or integral with a shoe or sleeve 21, mounted and sliding on a track or way 22. (See Fig. 9^a.) The upper part of the post 20 also extends through one of the links 15' of the chain 15 to connect the chain therewith. A thumb-screw 23 turns on the upper threaded end of the post 20 and secures said bar 19 on the post 20 and connects it with the chain 15. To the opposite ends of the transverse bar 19 are secured the ends of the connector-rods 25 25, preferably in the manner shown in Fig. 7 of the drawings. The outer ends of the bar 19 have thereon the curved or cup-shaped projections 19', which are hollowed out on their inner surfaces to receive the cup-shaped nut 25' on the rods 25, as shown in Fig. 7. The end of the connector-rod 25 extends through an opening in the portion 19' and has thereon at its end a hollowed-out or cup-shaped piece 26, which extends partially over and is adapted to move on the convex surface of the portion 19'. The end of the rod 25 has a nut 27 thereon to hold the parts 25', 19', and 26 in engagement and to form what may be termed a "ball-and-socket joint." The opposite ends of the connectors 25 are secured by a screw 28 in a cap-piece 29, pivotally secured by a screw 30 between the ears or stands 31' on the slide or casting 31. The slide 31 at its inner end is held between and slides in ways or tracks 32' on the stand or casting 32, secured to the oar 5, as shown in Figs. 1 and 8, so that the oar may have a rotary motion.

The outer end of each oar 5 is pivotally connected with the outer ends of the arms or outriggers 4', so as to have a pivotal motion thereon in a horizontal and vertical plane and also have a rotary motion thereon, preferably in the manner shown in Fig. 4. Extending up from the outer ends of the arms 4' and secured thereto is a pin or stud 36, upon which is loosely mounted to have a motion in a horizontal plane the hub 37' of a support 37. The hub 37' has a circular recess therein to receive the rounded end 5'' on the casting 5', secured on the end of the oar 5, as fully shown in Fig. 4.

Forming a part of the support 37 is a slotted upright stand 37'', which has internal ribs or

ways 37''' thereon which extend into the annular groove on the part 5''' of the casting 5' on the oar 5, as shown in Figs. 4 and 4^a, and hold said oar in the direction of its length, but allow it to move in a vertical plane and also to rotate freely. The lower part of the stand 37'' is made without the ribs 37''' to allow of the part 5''' on the casting 5' being inserted into said stand and then passed up between the ribs 37''', which receives the inner rounded and grooved portion 5''' of the casting 5' on the end of the oar 5 to guide the movement of the oar in a vertical plane and also allow it to rotate. A compressible spiral spring 38 extends within the lower part of the upright stand 37'', with one end extending into a recess in the stand and the other end encircling a pin 39' on a block 39, sliding within the stand, and bearing against the rounded part 5''' of the casting 5' on the end of the oar 5 to hold the oar in its raised position. When the oar is pushed down, the spring 38 is compressed.

Inclined movable foot-rests 40 are combined with a plate or casting 41, secured to the base 1. The casting 41 consists of a bar or plate which has two or more holes 41' through the upper side thereof to receive the screw-threaded end 42' of the thumb-screw 42, extending through the plate or rib 40', connecting the two foot-rests 40. (See Fig. 6.)

The plate 40', connecting the two foot-rests 40, is grooved or cut out on its under surface to receive the bar or plate 41, as shown in Fig. 6, the shape of the groove or recess in the plate 40' corresponding to the shape or form of the plate 41 in cross-section, so that there can be no side motion or tilting of the foot-rests 40 on their support, and the screwing in of the thumb-screw 42 binds the foot-rests 40 securely to their support. A second plate or bar connecting the two foot-rests 40 at their heel portion, as shown in Fig. 1, may be used. The foot-rests 40 are removed from the casting or plate 41 by simply screwing out the thumb-screw 42.

By means of the holes 41' in the casting 41 and the thumb-screw 42 the position of the foot-rests 40 may be altered to bring them nearer the seat 3 or move them farther away, according to the length of the legs of the rower.

Referring to Fig. 3, I have shown my improvements in rowing-machines adapted to be used when one oar only is used by each rower. A number of the machines may be put together in alinement to make a rowing-machine for two or more rowers, as desired, each rowing-machine being independent. In said Fig. 3 the several parts shown correspond in construction and operation to the parts shown in Fig. 1, except that there is only one side extension or arm 4' on each machine for a single oar and the parts are placed end to end, so as to bring the alternate oars on opposite sides of the rowing-machines, as

shown. The connector-rod 25, extending from the oar 5, is attached to the post 20 without the intervention of any transverse bar 19.

It will be understood that the details of construction of some of the parts of my rowing-machine may be varied somewhat from what is shown and described, if desired.

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

1. In a rowing-machine, the combination with ways or tracks, a seat sliding thereon, oars supported at one end to have a movement in a vertical and horizontal plane, and also a rotary movement, and connected with an endless chain passing around two sprocket-wheels, and said chain and sprocket-wheels, of friction mechanism connected with one of the sprocket-wheels, and consisting of a pulley, a belt extending around the same, and secured at one end, and the other end adjustable, to vary the friction of the belt on the pulley, and a spring forming a yielding attachment for the adjustable end, substantially as shown and described.

2. In a rowing-machine, the combination with ways or tracks, a seat sliding thereon, an oar supported at one end, a connector from said oar to an endless chain passing around two sprocket-wheels, and said chain and sprocket-wheels, of friction mechanism connected with one of said sprocket-wheels, and consisting of a pulley, a belt extending around the same, and secured at one end, and the other end adjustable, to vary the friction of the belt on the pulley, and yieldingly attached to allow of the free reverse movement of the pulley, substantially as shown and described.

3. In a rowing-machine, the combination

with ways or tracks, a seat sliding thereon, oars supported at one end to have a movement in a vertical and horizontal plane, and also a rotary movement, and connected with an endless chain passing around two sprocket-wheels, and said chain and sprocket-wheels, of friction mechanism connected with one of the sprocket-wheels, and consisting of a pulley having an oil reservoir or chamber therein, a belt extending around the same, and secured at one end, and the other end adjustable, to vary the friction of the belt on the pulley, and a spring forming a yielding attachment for the adjustable end, substantially as shown and described.

4. The combination with a pivoted or swivel support, and a slotted stand thereon having internal ribs or ways, of an oar extending through said slotted stand, and having a rounded portion to engage said ribs or ways, and having its end rounded to extend into a recess in said support, and a spring acting to hold said oar in its elevated position, substantially as shown and described.

5. The combination with an oar, supported at its outer end to have a pivotal motion in a horizontal and vertical plane, and also a rotary motion, of a connector-rod, pivotally attached at one end to a slide or casting, moving in ways or guides on said oar, to allow said oar to have a rotary motion, and connected at its other end by a ball-and-socket joint to a transverse bar or whiffletree on an endless chain, substantially as shown and described.

E. J. KERNS.

Witnesses:

J. C. DEWEY,
M. J. GALVIN.