

(No Model.)

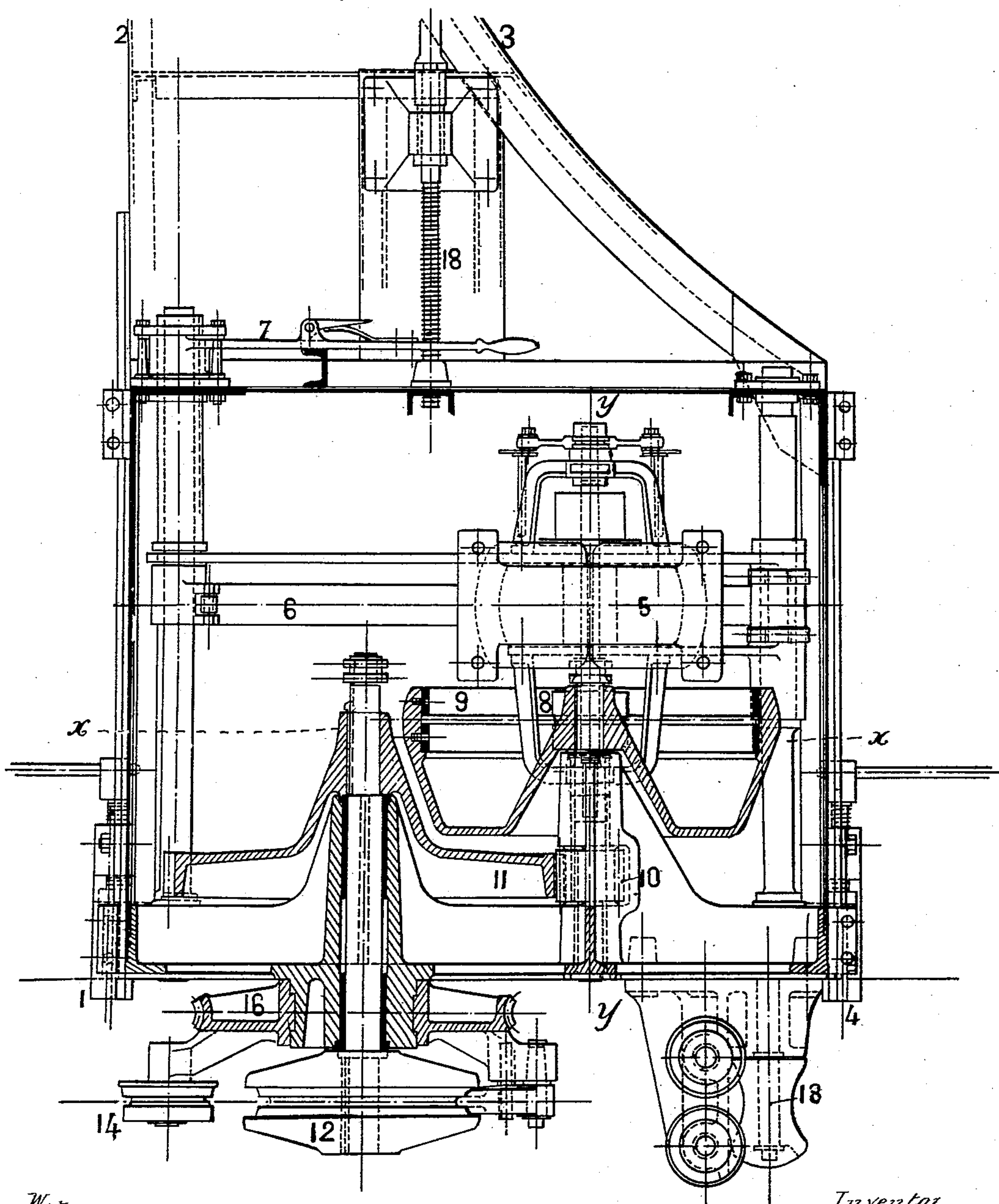
5 Sheets—Sheet 1.

A. DE BOVET.
TOWING APPARATUS.

No. 570,839.

Patented Nov. 3, 1896.

FIG. 1



Witnesses

G. W. Rea.

Dennis Sully

Inventor

Armand de Bovet,

By James L. Norris

Atty.

(No Model.)

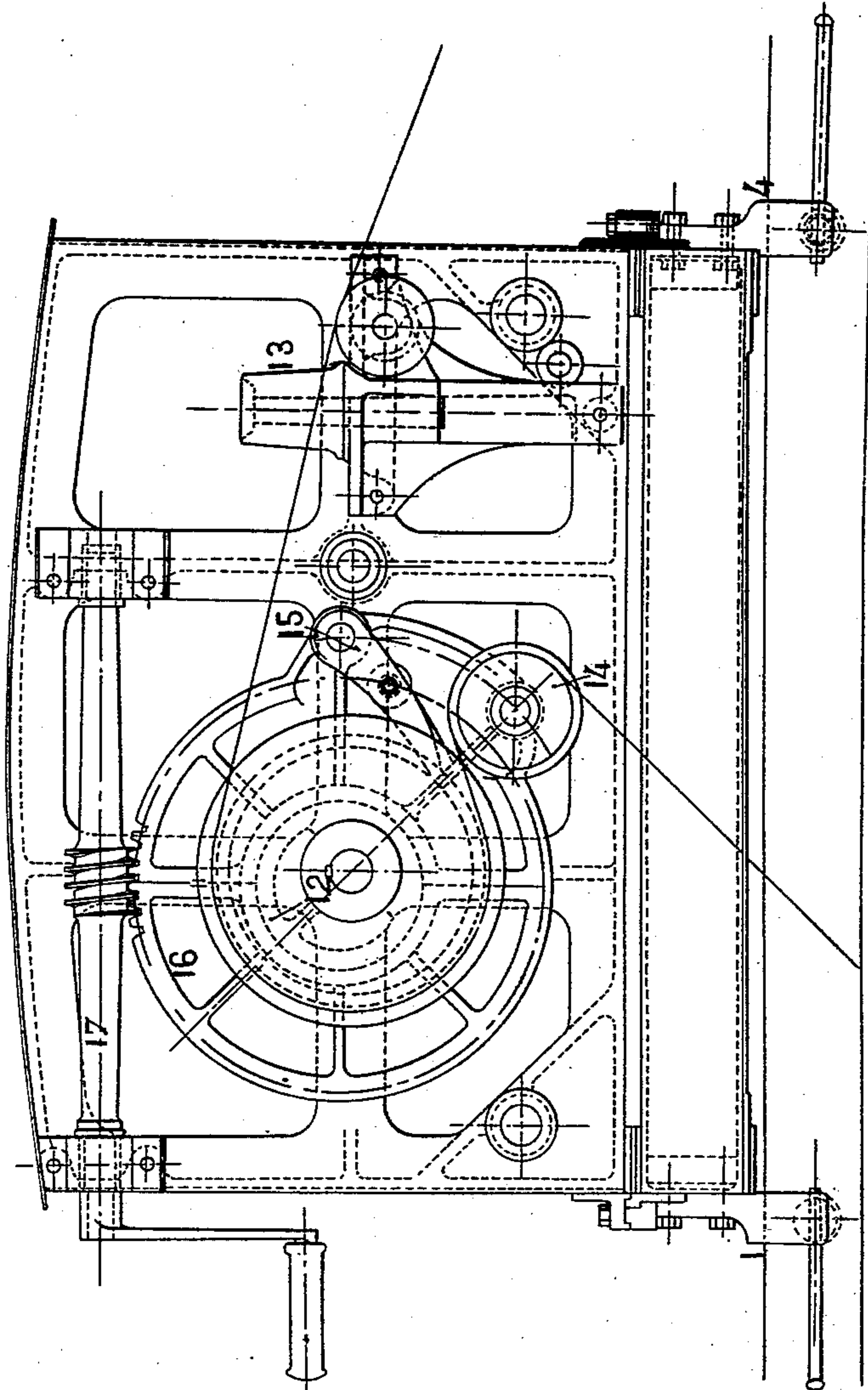
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A. DE BOVET.
TOWING APPARATUS.

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Patented Nov. 3, 1896.

FIG. 2



Witnesses

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(No Model.)

5 Sheets—Sheet 3.

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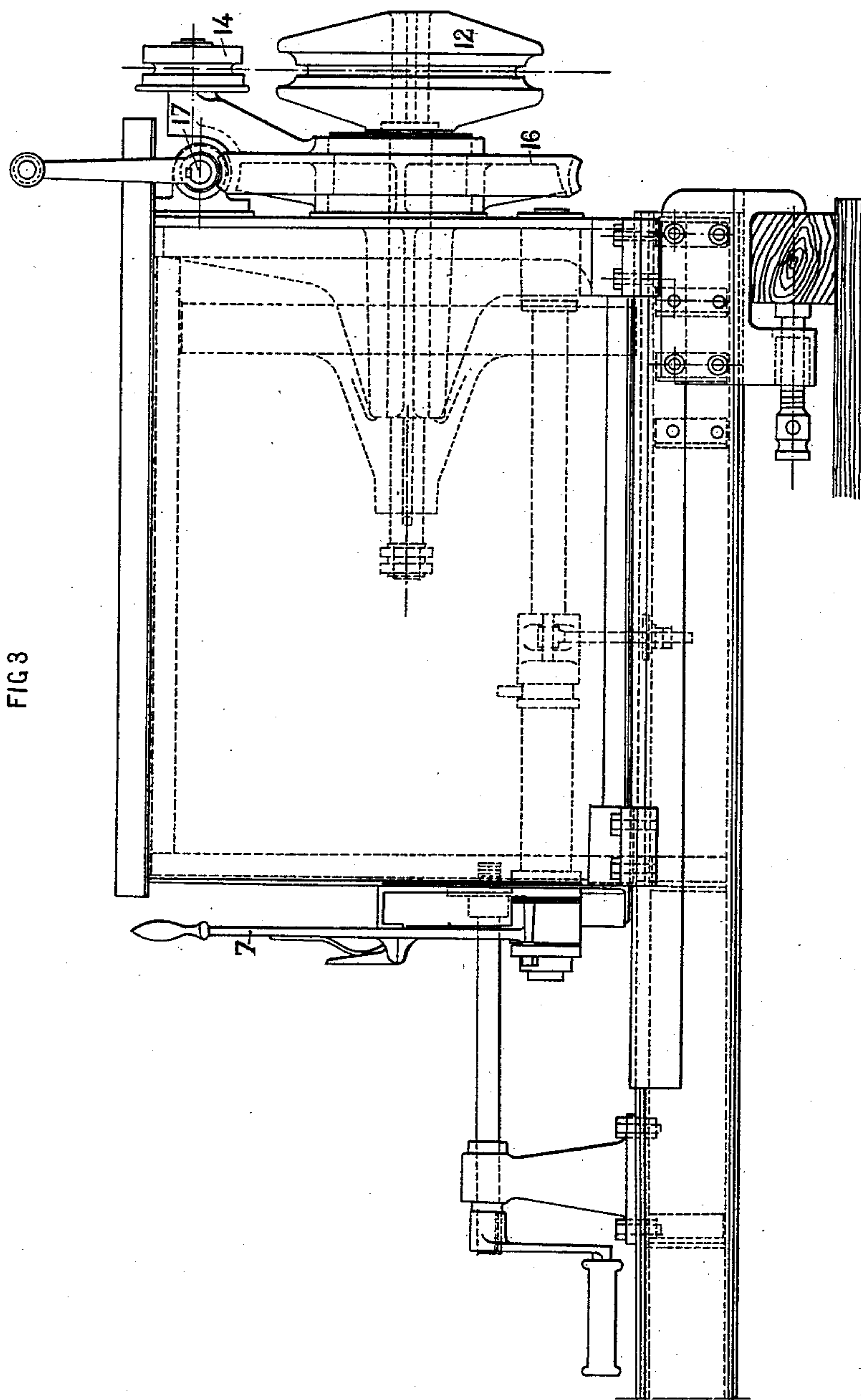


FIG 3

Witnesses

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Robert Everett.

Inventor

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James L. Norris,

Att'y

(No Model.)

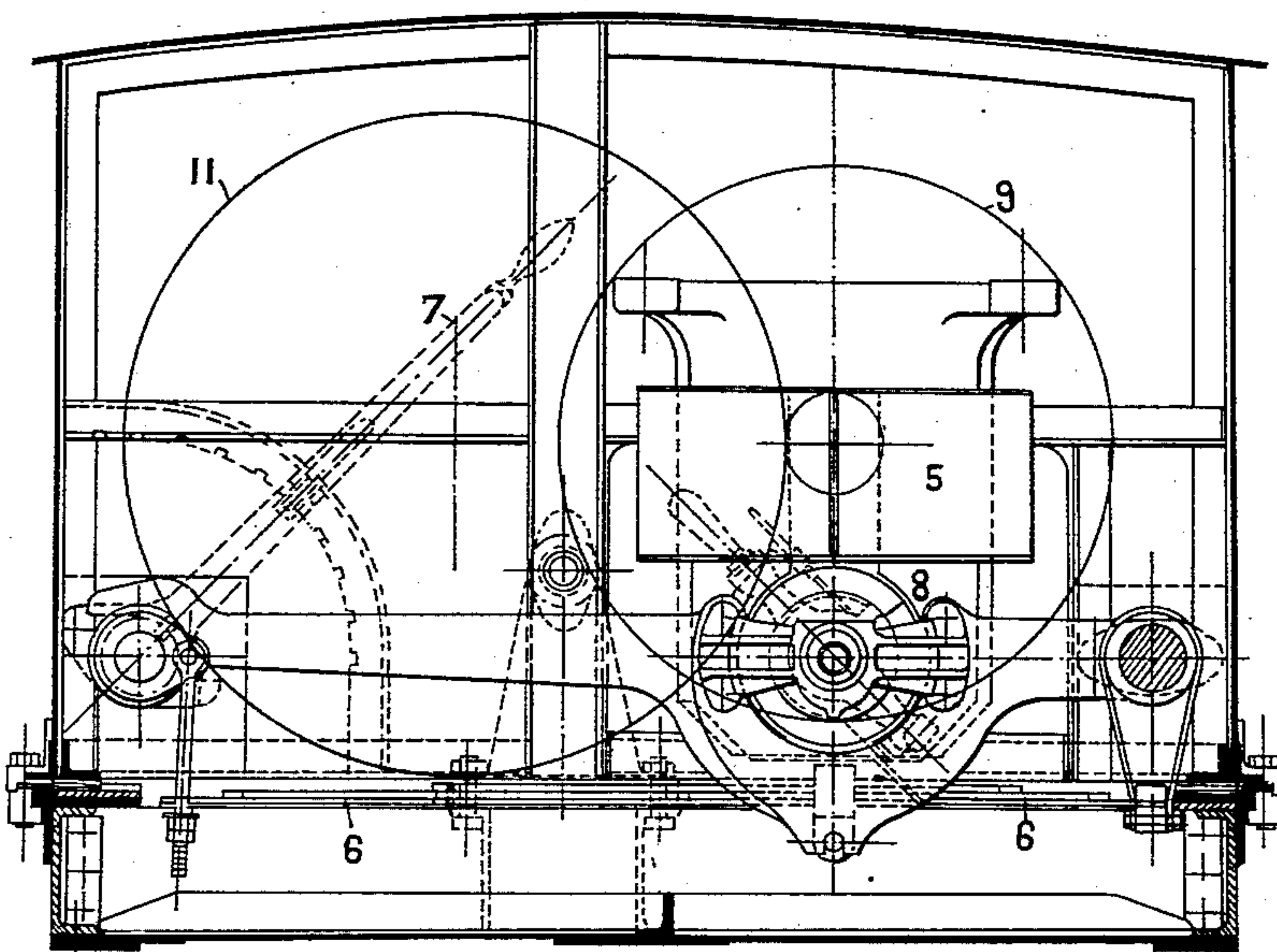
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A. DE BOVET.
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FIG. 4



Witnesses

Geo. W. Rea,

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(No Model.)

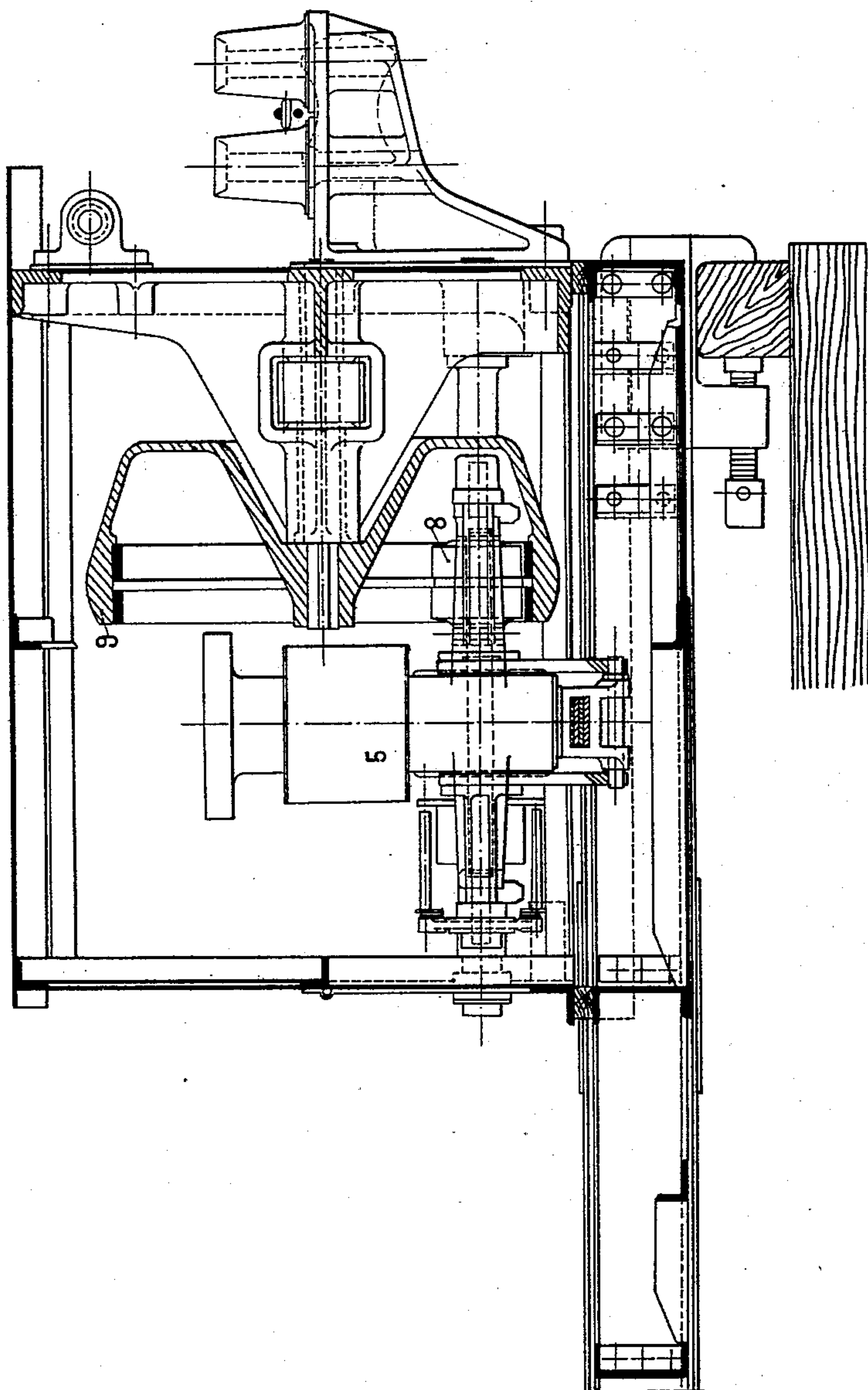
5 Sheets—Sheet 5.

A. DE BOVET.
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FIG. 5.



Witnesses.

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UNITED STATES PATENT OFFICE.

ARMAND DE BOVET, OF PARIS, FRANCE.

TOWING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 570,839, dated November 3, 1896.

Application filed April 5, 1894. Serial No. 506,451. (No model.) Patented in France May 25, 1892, No. 211,852.

To all whom it may concern:

Be it known that I, ARMAND DE BOVET, a citizen of France, and a resident of Paris, in the Department of the Seine, France, have invented a new and useful Improvement in Towing Apparatus, (for which Letters Patent have been granted in France, No. 211,852, dated May 25, 1892,) of which the following is a specification.

My invention relates to improvements in towing apparatus, and has for its object to convert carrying-barges, while on their journey through a canal, into tow-boats capable of being towed individually along a chain sunk throughout the length of the canal. I obtain this result by means of a removable towing apparatus which may be supplied to each boat on entering the canal and be removed therefrom on leaving, and the superintendence of which does not necessitate any increase of the crew. If the amount of traffic require it, two chains may be used, one for boats coming up, the other for boats going down.

In order that my invention may be readily understood, I have shown, by way of example, an apparatus of this kind in the annexed drawings, in which—

Figure 1 is a horizontal section of the apparatus, taken through the axis of the towing-pulley. Fig. 2 is a side elevation of the same. Fig. 3 is an elevation of the apparatus at a right angle to Fig. 2. Fig. 4 is a vertical section on the line $x x$ of Fig. 1. Fig. 5 is a vertical section on the line $y y$ of Fig. 1.

An iron framework 1 2 3 4 is fixed by clamping-screws or otherwise on the gunwales of the boat toward the bow. The frame is made adjustable, so that a pull in the direction 1 2 permits of the length of the frame being regulated according to the width of the boat. On the widened part of the frame the towing apparatus is mounted and is completely inclosed in a casing. It consists of an electro-motor, of a magnetic adhering towing-pulley, and of the necessary gear for transferring the speed of the motor to the pulley, and, further, of various accessory parts or fittings, as will be described hereinafter.

The electric motor 5 is carried upon a spring-plate 6, and drives a fly-wheel 9 by means of a small magnetic pulley 8, Fig. 1. This

pulley 8 produces the driving both by friction and by magnetic adhesion, and being connected with the shaft of the elastically-supported motor it bears elastically on the fly-wheel, to which it remains tangent interiorly, in order that contact be always insured even if there be any faults in the turning. Owing to the action of the magnetic adhesion it is not necessary to set up between these two parts a pressure as strong as that which would be necessary in the case of simple friction, and it is best to so regulate this pressure that the action on the bearings of the motor shall not exceed that which would be necessary in the case of driving by belts or straps. The mounting of the motor on a spring suspension-plate permits the regulation of the pressure of pulley 8 in accordance with the preceding indications, such regulation being effected by means of a lever 7, connected with a cam or eccentric arranged in bearing contact with the under side of one extremity of the spring-plate 6 and adapted to change the adjustment of said plate and the motor supported thereon, so as to vary the pressure of the pulley 8 on the fly-wheel.

The shaft of the fly-wheel carries a pinion 10, which meshes with a toothed wheel 11, and the shaft of this latter carries the towing-pulley 12 at its end. In front of this pulley is an arrangement of three guide-rollers 13, which receive the chain on its entrance into the apparatus. On leaving the towing-pulley this chain passes over a guide-roller 14, which nearly touches the main pulley at the point of exit, the separation of the rest of the chain being insured by a finger 15.

The guide-roller 14 is carried by a worm-wheel 16, which forms the strap of an eccentric around the shaft of the towing-pulley, and the movement of which is produced by a crank-handle and a worm 17. When by this movement of the worm-wheel the guide-roller is brought to one hundred and eighty degrees from the position which it occupies in Fig. 2, it has receded from the towing-pulley for double the radius of eccentricity. It is therefore in such a position that it does not offer any obstacle to the shifting of the chain or to its putting back in place.

The whole apparatus under the action of the adjusting-screw 18, Fig. 1, is free to slide

along the framework and to return for such a distance that in passing through the lock-gates the towing and the guide rollers no longer project outside the boat.

5 By means of an under trolley, or, better still, by an upper trolley of any kind, the apparatus receives as it goes along the necessary current from an overhead line installed along the canal for the magnetization of the
10 pulleys and for energizing the motor. Any of the known means in use for taking the current for electrical tramways may, however, be used here; but the upper trolley appears preferable to the under one, since it allows
15 a greater lateral mobility of the boat. The return of the current may be effected by a second line or by the tow-chain.

In the preceding description the whole of the part relating to the transmission of movement between the motor and the towing-pulley refers only to the apparatus shown on the
20 drawings; but this particular construction is not inherent or essential to the system in itself.

25 I consider it good to avoid on the shaft of the motor gearing working at high speeds

and to interpose an apparatus limiting the sensible force to avoid accident should a boat run into the bank; but this arrangement may be replaced by any others in general use
30 whereby the speed of the motor may be transferred to the pulley (such as friction-gearing, endless screw, gear, &c.) with or without the interposition of a limiter of force.

Having fully described my invention, what
35 I claim is—

In a towing apparatus, the combination of an elastically-supported electric motor, a magnetized friction-pulley connected with
40 and adapted to be actuated from said motor, a fly-wheel with which said pulley is in elastic contact, a towing-wheel, and gearing intermediate said towing-wheel and fly-wheel shaft, substantially as described.

In testimony whereof I have signed this
45 specification in the presence of two subscribing witnesses.

ARMAND DE BOVET.

Witnesses:

CLYDE SHROPSHIRE,
W. FORD.