

P. VINDRIER.

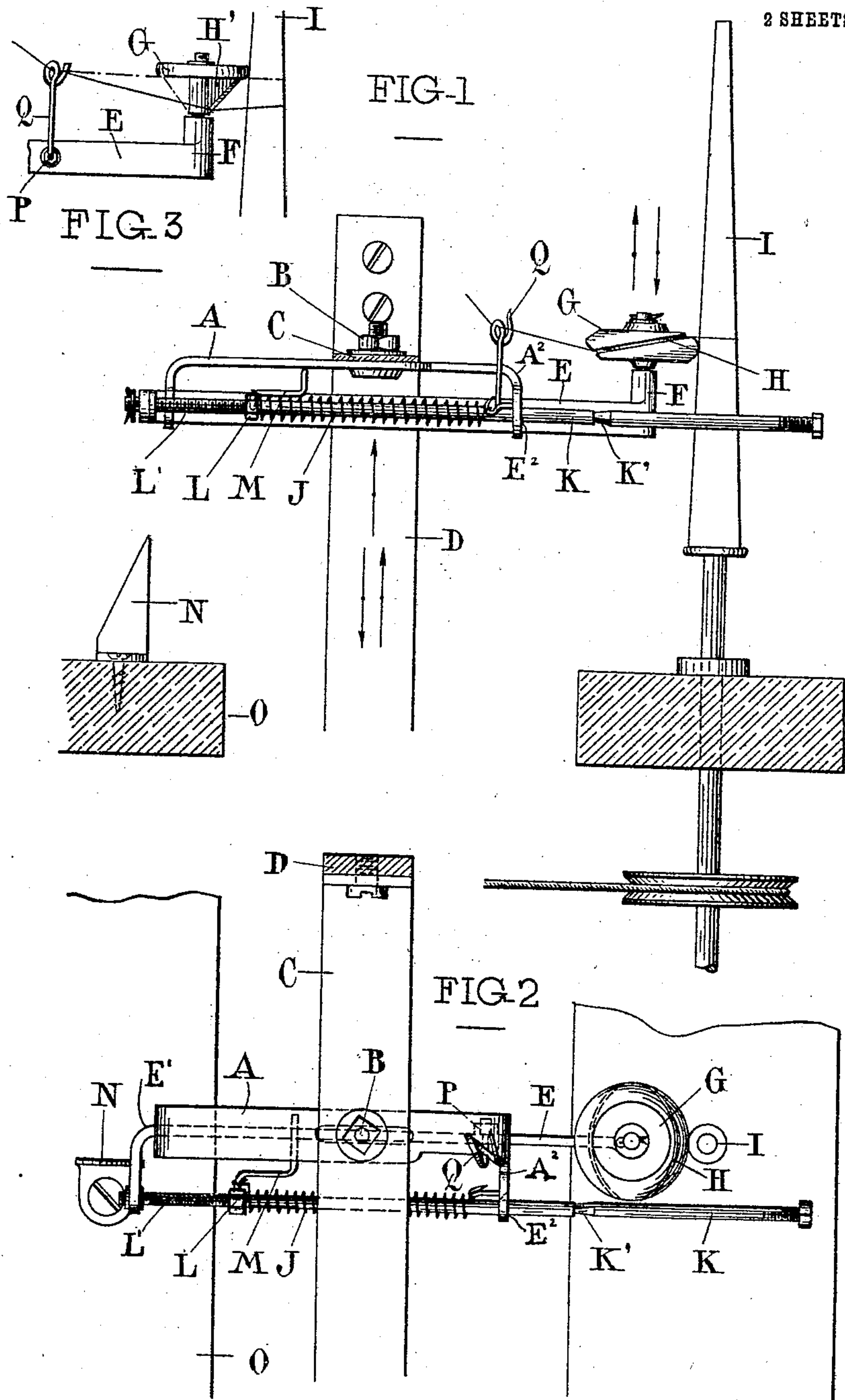
WINDING MACHINE.

APPLICATION FILED MAR. 16, 1907.

908,525.

Patented Jan. 5, 1909.

2 SHEETS—SHEET 1.



Witnesses

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Inventor

Pierre Vindrier

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2 SHEETS—SHEET 2.

FIG-4

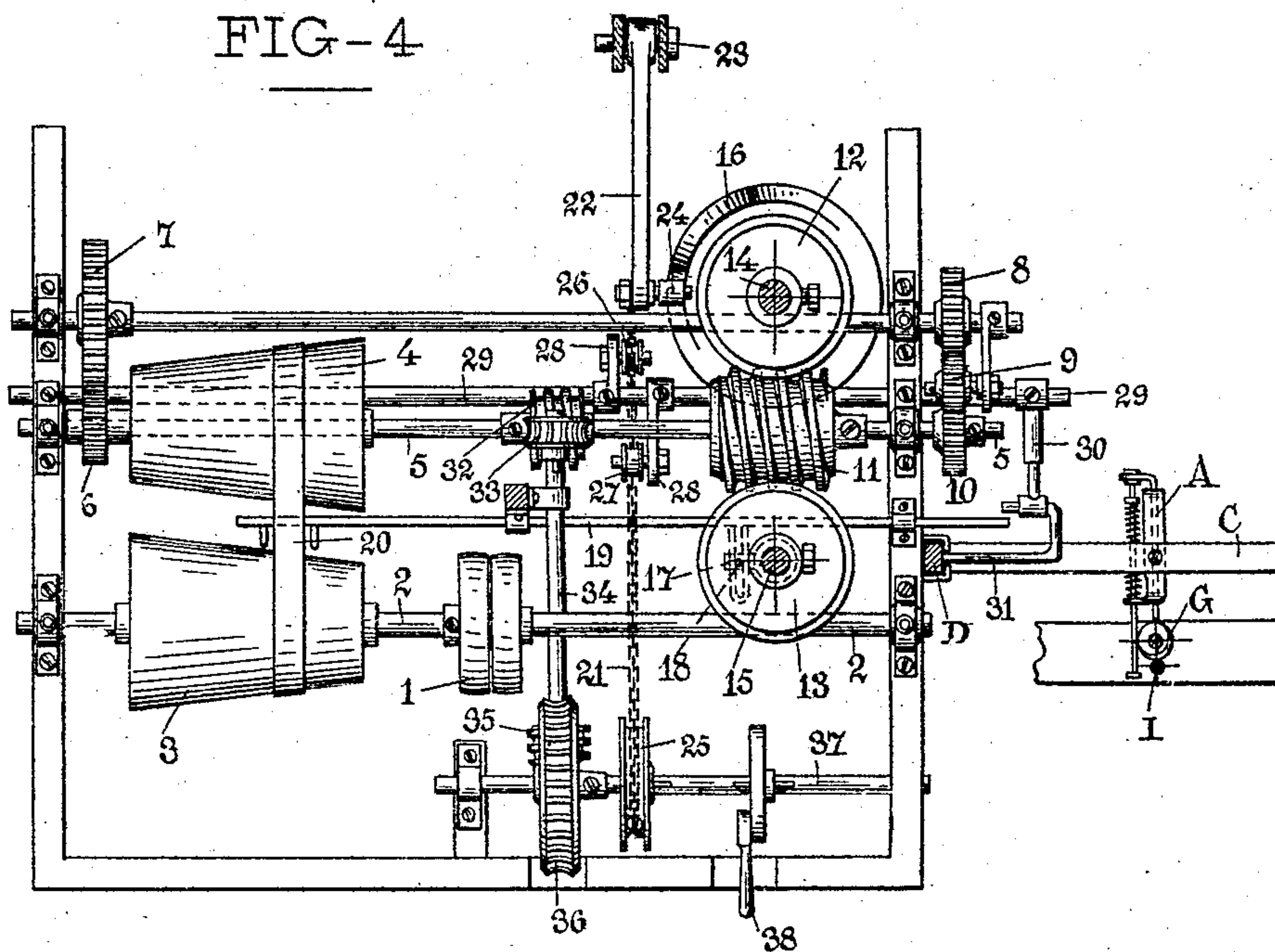


FIG-6

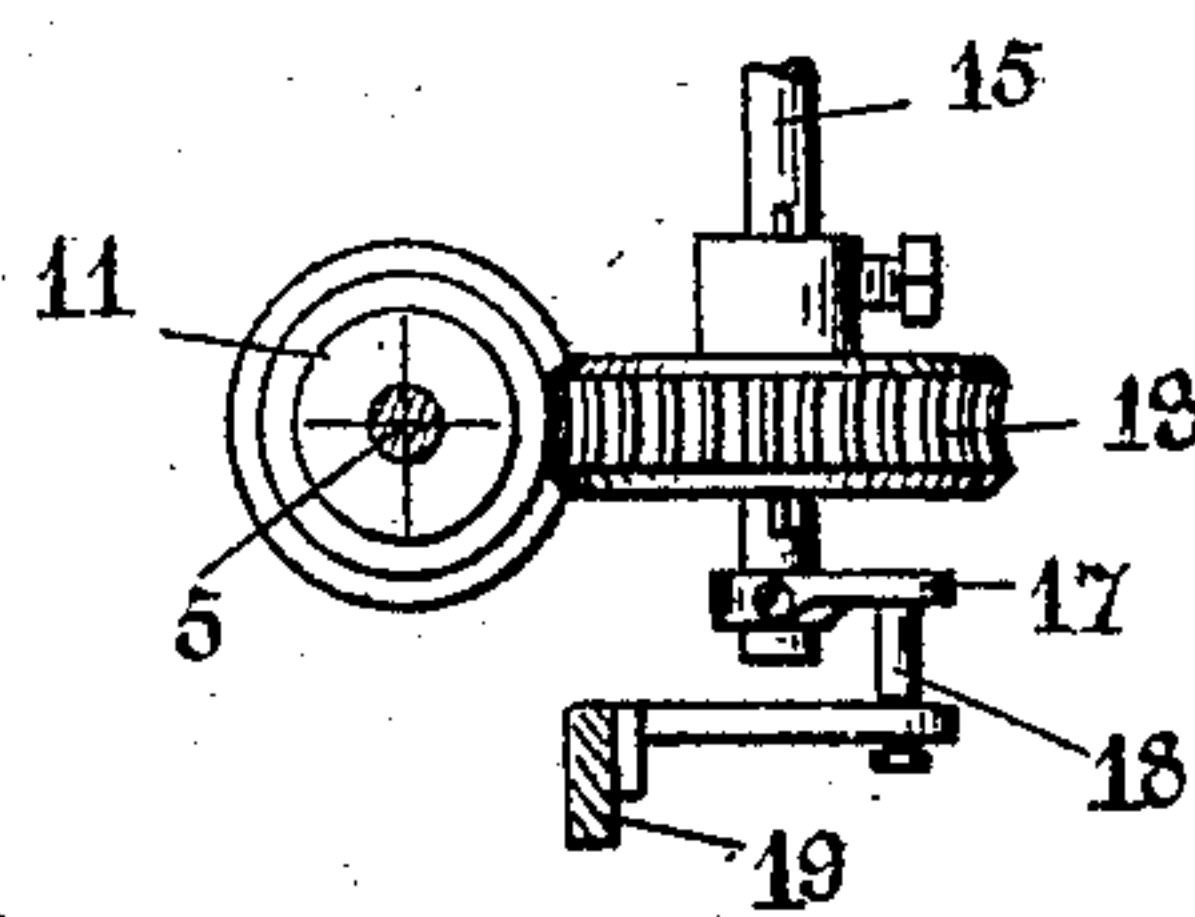
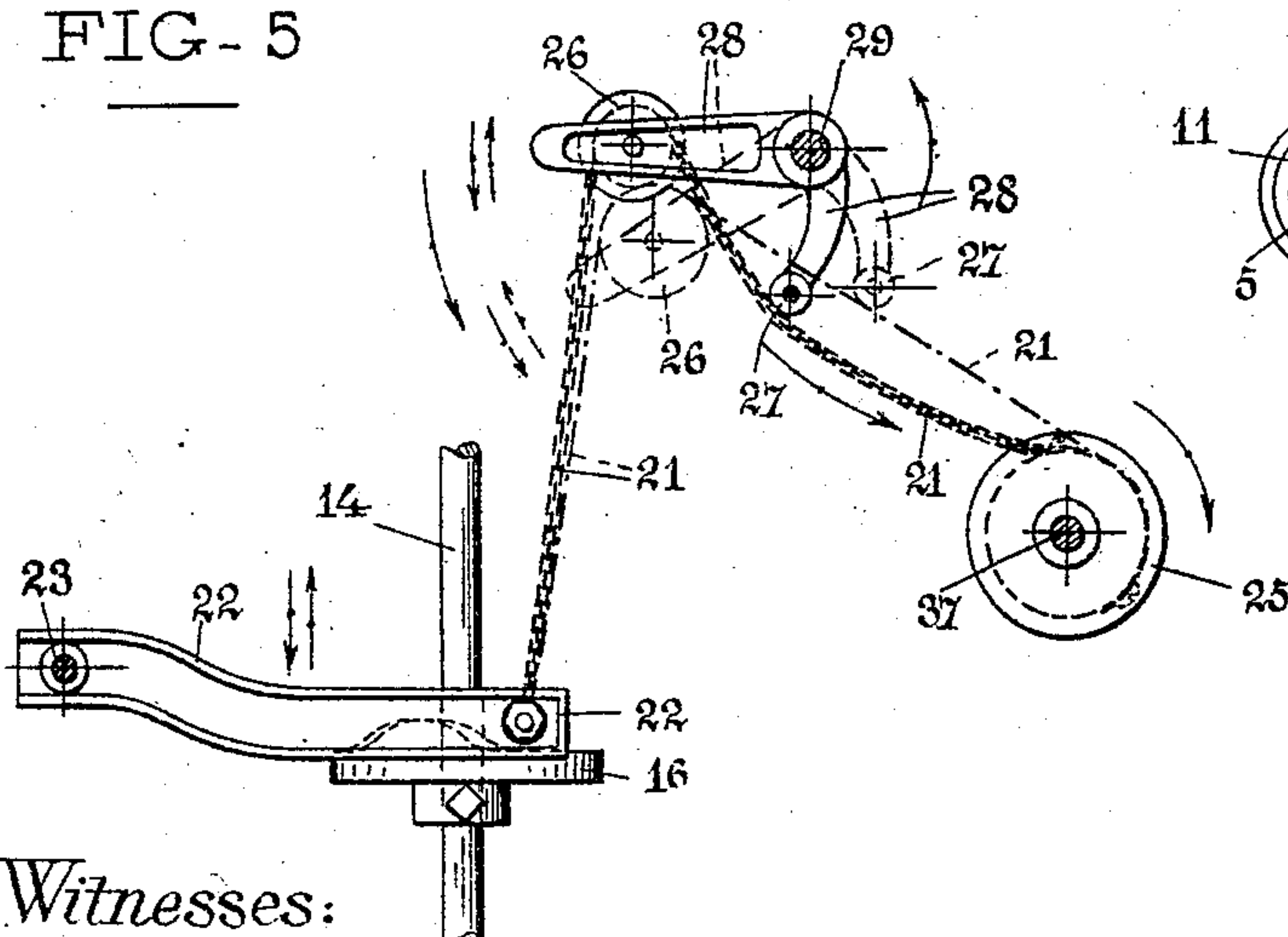


FIG-5



Witnesses:

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UNITED STATES PATENT OFFICE.

PIERRE VINDRIER, OF LYON, FRANCE, ASSIGNOR OF ONE-THIRD TO JOSEPH VINDRIER AND ONE-THIRD TO LEON VINDRIER, OF ROANNE, FRANCE.

WINDING-MACHINE.

No. 908,525.

Specification of Letters Patent.

Patented Jan. 5, 1909.

Application filed March 16, 1907. Serial No. 362,649.

To all whom it may concern:

Be it known that I, PIERRE VINDRIER, a citizen of the French Republic, residing at Lyon, in the French Republic, have invented certain new and useful Improvements in Winding-Machines, of which the following is a specification.

The improvements in winding machines which form the object of the present invention have for their purpose to allow of obtaining tightly cross-wound cops which do not become unwound by the effects of the impacts of the shuttle, and the invention also has the advantage of considerably increasing the amount of thread in a cop of given size. These results are obtained by substituting for the ordinary thread-guides a roller which continuously rubs against the cop to be produced, whatever may be its size, this roller having formed around it an oblique groove destined to impart to the thread, by the rotation of the roller, a very rapid reciprocating movement combined with the movements common to other winding machines.

The annexed drawing shows in Figure 1 an elevation and in Fig. 2 a plan-view of an element comprising a thread-guide and spindle. Fig. 3 is a detail view of a modification of the roller. Figs. 4 and 5 are respectively a plan and side view of the mechanism for imparting movement to the yarn guide. Fig. 6 shows a detail of mechanism for varying the speed of the movements imparted to the yarn guide.

Each element comprises a guide-support A fixed by a bolt and nut B to a common bar C extending all along the machine and fixed at its two ends to a slide D having a double vertical movement, namely a continuous slow movement from bottom to top and a reciprocating movement of greater or less amplitude. Both these are obtained by the ordinary known means and are sufficiently indicated by the three arrows upon the slide D in Fig. 1.

The guide-support A is traversed with slight friction by a bar E bent at one end at E¹ and soldered at the other to a socket F on which turns a roller G having on its circumference an oblique groove H, or inclined plane H¹. This roller normally bears against the spindle I owing to the ac-

tion of a spring J surrounding a rod K fixed to the bent end E¹ of the bar E and extending with slight friction through a hole E² provided in a lug A² at the front part of the guide-support A.

The tension of the spring J is regulated by a small compressing nut L to which an arm M is fixed to prevent its rotation. The arm M bears against the guide A. The forward or rearward movement of this nut L is produced by turning the rod K, which is threaded on part of its length at L¹. At its opposite end the said rod is provided with a notch K¹, which, when the rod is moved towards the left, engages the hole E² formed in the lug A¹ of the guide-support A and thus retains the roller G at a distance from the spindle to allow, for example, of mending a broken thread.

For removing the cops when finished, it is sufficient to lower the slide D in the ordinary manner. The bent, left-hand parts E¹ of the bars E of all the elements are then acted on by a series of inclined planes N fixed to a table O, and the rollers are simultaneously removed from the respective cop-spindles.

The end-position of the bar E is limited by a small nut P, screwed upon and serving also as means for securing in place the end of a bent wire Q which is carried by the bar E and forms at the same time a ring for guiding the thread coming from the bobbins.

The several movements of the yarn guide are produced by means of the mechanism shown in Figs. 4, 5 and 6. In Fig. 4, 1 is a driving pulley fixed to a shaft 2, to which is also fixed a cone pulley 3. The latter is geared by a belt 20 to a cone pulley 4 loose on a shaft 5. A spur wheel 6 is fixed to the pulley 4 and meshes with a spur wheel fixed to a counter shaft which is connected by a train of gear 8, 9, 10 to the shaft 5. To the shaft 5 is fixed a worm 11, which engages worm wheels 12 and 13 fixed to vertical shafts 14 and 15 respectively. To the shaft 14 is fixed a cam 16 (Figs. 4 and 5), rotation of which imparts reciprocating movement to the slide D carrying the bar C. This movement is transmitted to the slide D by means of a chain 21 attached to a lever 22 which is fulcrumed at 23 and carries a roller 24 resting on the cam 16. The said

chain is also attached to a drum 25, and passes over a roller 26 and under a roller 27, as shown in Fig. 5. The rollers 26 and 27 are carried by lever arms 28 fixed to a shaft 29. The latter is connected to the slide D by an arm 30 engaging a rod 31 which projects from the slide. The shaft 5 has fixed to it a worm 32 engaging a worm wheel 33 fixed to a shaft 34. To the latter is fixed a worm 35 engaging a worm wheel 36 fixed to a shaft 37. The drum 25 to which the chain 21 is attached is also fixed to the shaft 37, so that the rotation imparted to the latter by the worm gears causes the chain to be slowly wound on the drum. The pull thus exerted on the chain gradually moves the levers 28 and rollers 26 and 27 into the positions indicated by dotted lines in Fig. 5, and by this means the shaft 29 is slowly rotated to lift the slide D. During this lifting movement the rotating cam 16 alternately lifts the lever 22 and allows it to descend to normal position by gravity. The lifting of the lever 22 and the consequent yielding of the chain enable the weight of the slide D and parts fixed thereto to rock the shaft 29 through a certain angle; the lowering of the lever 22, and the drag exerted thereby on the chain, cause the shaft 29 to rock through an angle in the opposite direction. This rocking movement is additional to the slow rotation imparted by the drum 25, so that the slide D receives reciprocatory motion simultaneously with its upward feed motion. The shaft 15 rotated by the worm wheel 13 has a crank arm 17, the pin 18 of which engages a slotted arm fixed to a slidable bar. The latter has projections engaging the belt 20 on the cone pulleys 3 and 4, so that during the longitudinal displacement of the bar 19 by the crank arm 17 the belt is shifted on the said pulleys. By this means the speed of the shaft 5 and worm gears is gradually altered for the purpose of imparting the desired conical shape to the cops.

When the machine is started the rollers G bear against the spindles I, which, owing to their continuous rotation, rotate the said rollers. As has been stated the latter have a reciprocating movement of suitable amplitude combined with a slow upward displacement. Since, however, the grooves H encircling the rollers are inclined with regard to the axes of the latter, it follows that the threads passing through the said grooves receive a third movement of rapid reciprocation, the amplitude of which is equal to the distance between the highest and lowest points of the inclined grooves in the rollers. This third movement is of considerable importance, since it imparts a close crossing of special pattern which assists in preventing the disintegration of the cop. Moreover, the fact that the roller G

continuously bears against the cop also assists the compression of the thread and allows of obtaining hard cops containing a larger quantity of yarn than those hitherto manufactured.

What I claim as my invention and desire to secure by Letters Patent of the United States is:—

1. In a bobbin winding apparatus, the combination with a spindle, means for giving a reciprocatory motion parallel to the spindle for winding in successive layers, and means for giving a comparatively slow longitudinal feed motion for extending the layers progressively along the spindle, of further means for giving a comparatively rapid reciprocatory motion parallel to the spindle, this motion being additional to that for winding in successive layers for the purpose of causing the yarn to follow a sinuous line.

2. In a bobbin winding apparatus, the combination with a spindle, means for giving a reciprocatory motion parallel to the spindle for winding in successive layers, and means for giving a comparatively slow longitudinal feed motion for extending the layers progressively along the spindle, of further means comprising a rotary roller adapted to bear against the cop on the spindle, a spring tending to press the roller against the cop, the said roller being provided with an inclined groove serving as a thread guide and designated to impart to the thread a rapid reciprocating movement in addition to the ordinary movements of a winding machine.

3. In a bobbin winding apparatus, the combination with a spindle, means for giving a reciprocatory motion parallel to the spindle for winding in successive layers, and means for giving a comparatively slow longitudinal feed motion for extending the layers progressively along the spindle, of further means comprising a rotary roller adapted to bear against the cop on the spindle, a spring tending to press the roller against the cop, the said roller being provided with an inclined groove serving as a thread guide and designed to impart to the thread a rapid reciprocating movement in addition to the ordinary movements of a winding machine, and means for holding the roller removed from the cop.

4. In a bobbin winding apparatus, the combination with a spindle, means for giving a reciprocatory motion parallel to the spindle for winding in successive layers, and means for giving a comparatively slow longitudinal feed motion for extending the layers progressively along the spindle, of further means comprising a rotary roller adapted to bear against the cop on the spindle, a spring tending to press the roller against the cop, the said roller being pro-

vided with an inclined groove serving as
a thread guide and designed to impart to
the thread a rapid reciprocating movement
in addition to the ordinary movements of
5 a winding machine and an inclined plane
fixed to a table carried by the machine for
holding the roller removed from the cop.

In witness whereof I have signed this
specification in the presence of two wit-
nesses.

PIERRE VINDRIER.

Witnesses:

JEAN GERMAIN,
GUILLAUME PIOCHE.