No. 662,737. Patented Nov. 27, 1900.

M. PUSZKAR.

CURRENT MOTOR.

(Application filed Sept. 14, 1900.

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.

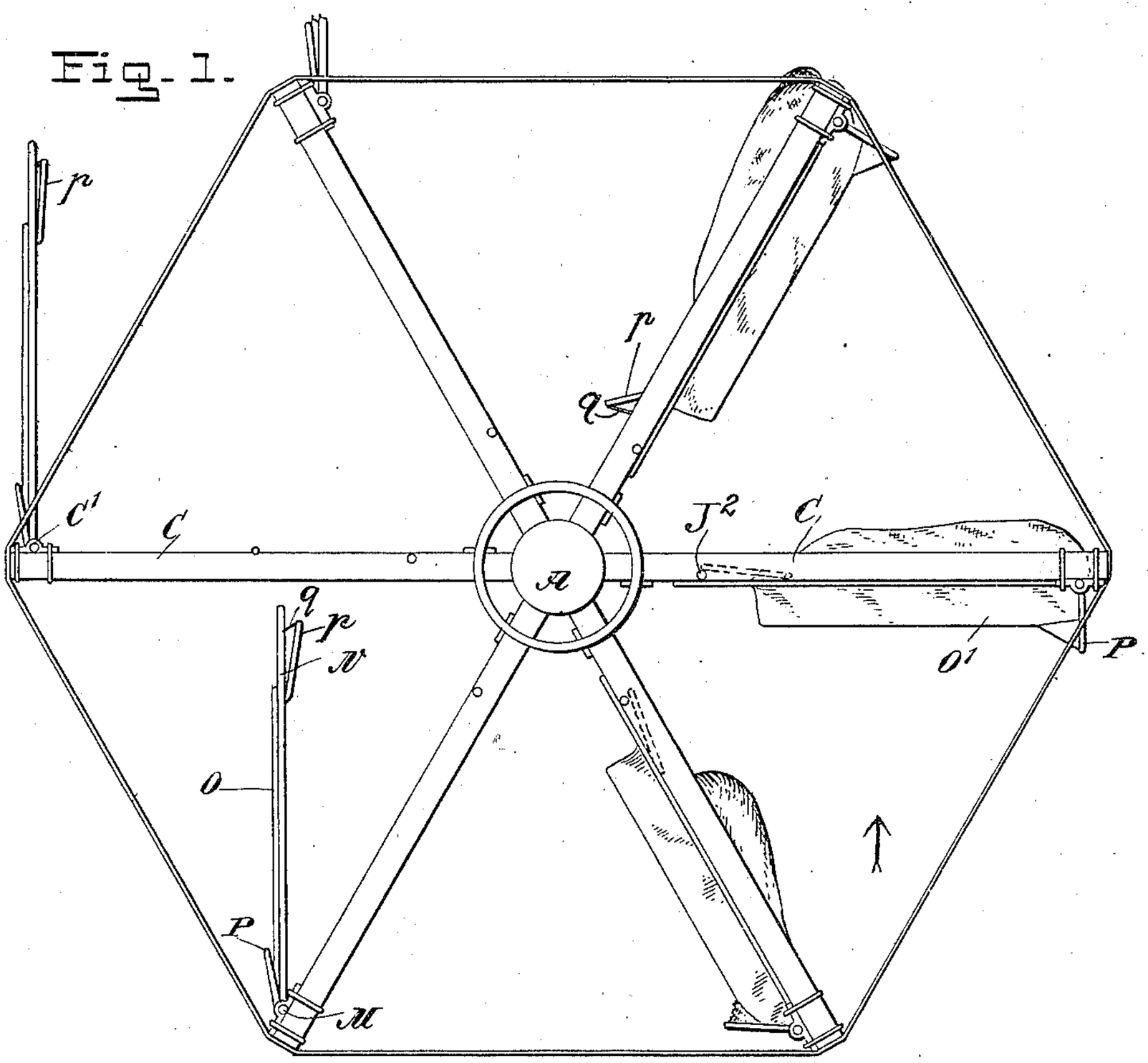

Fig. 2.

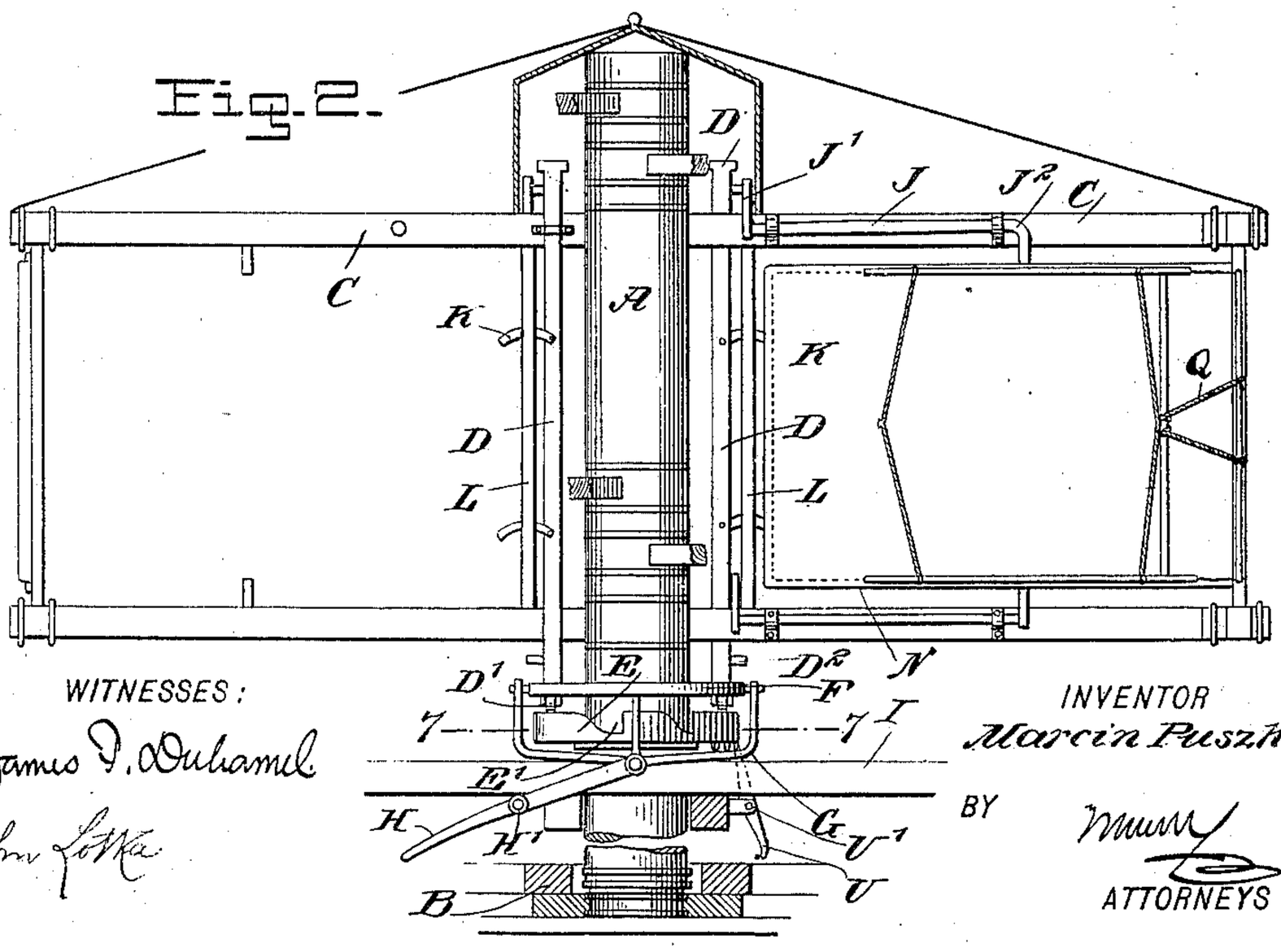

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Fig. 3.

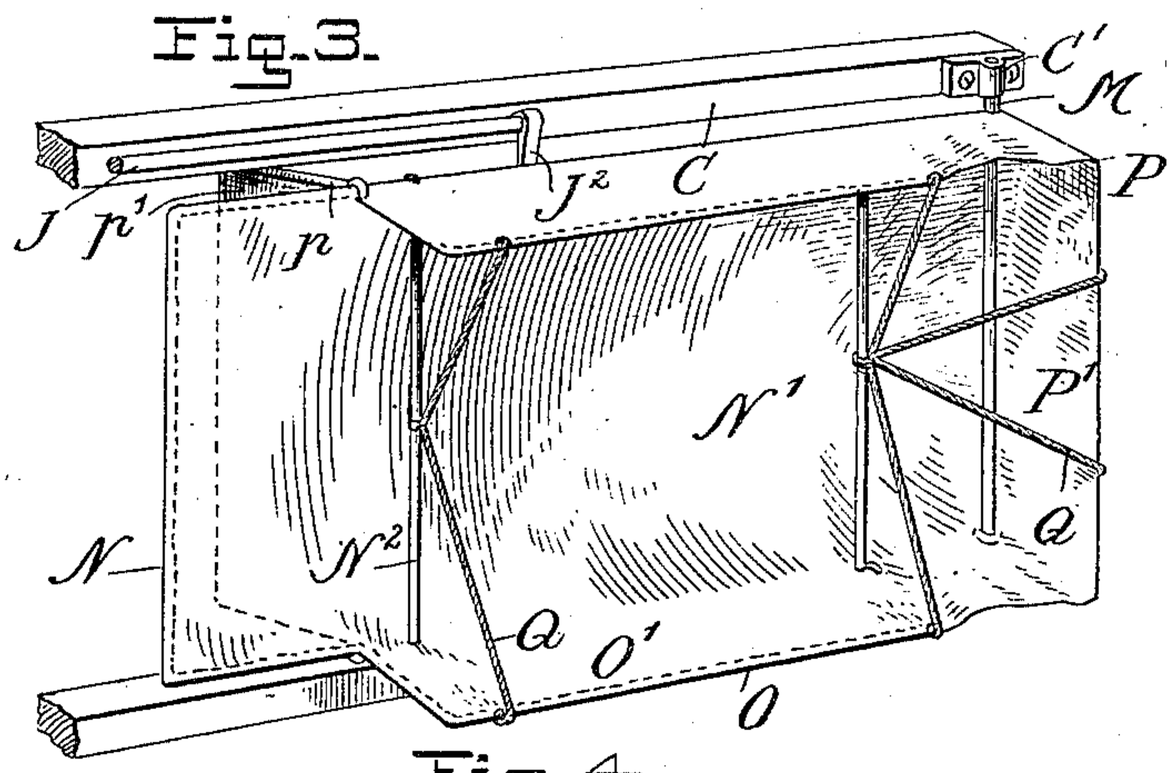

Fig. 4.

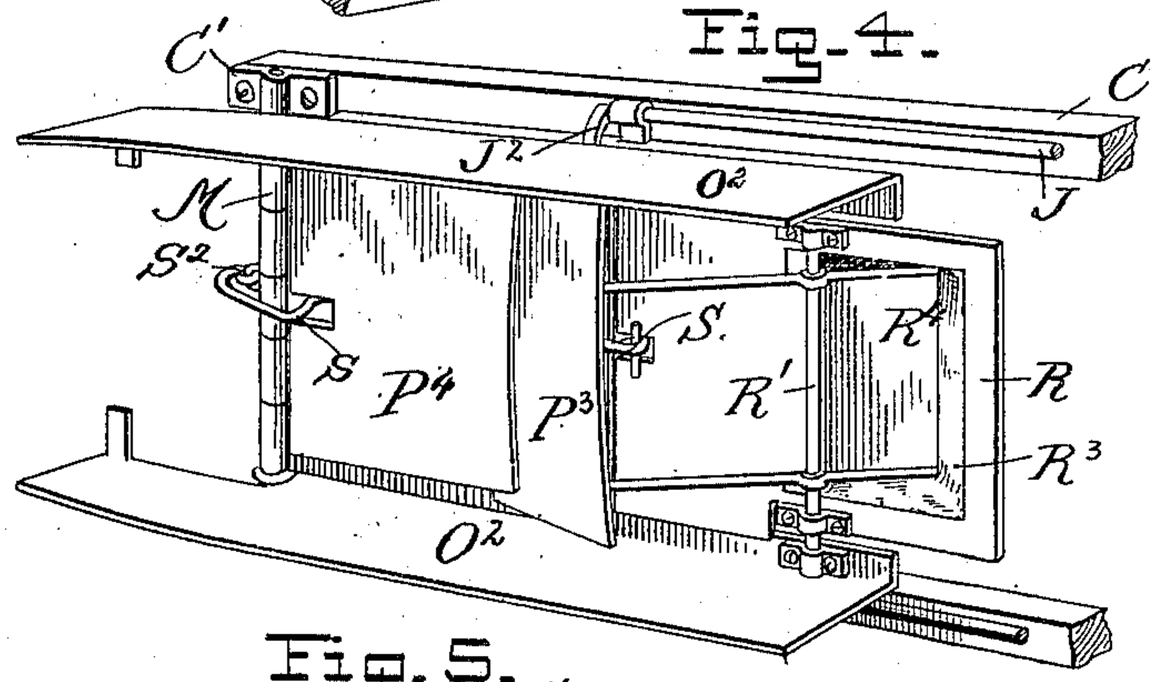

Fig. 5.

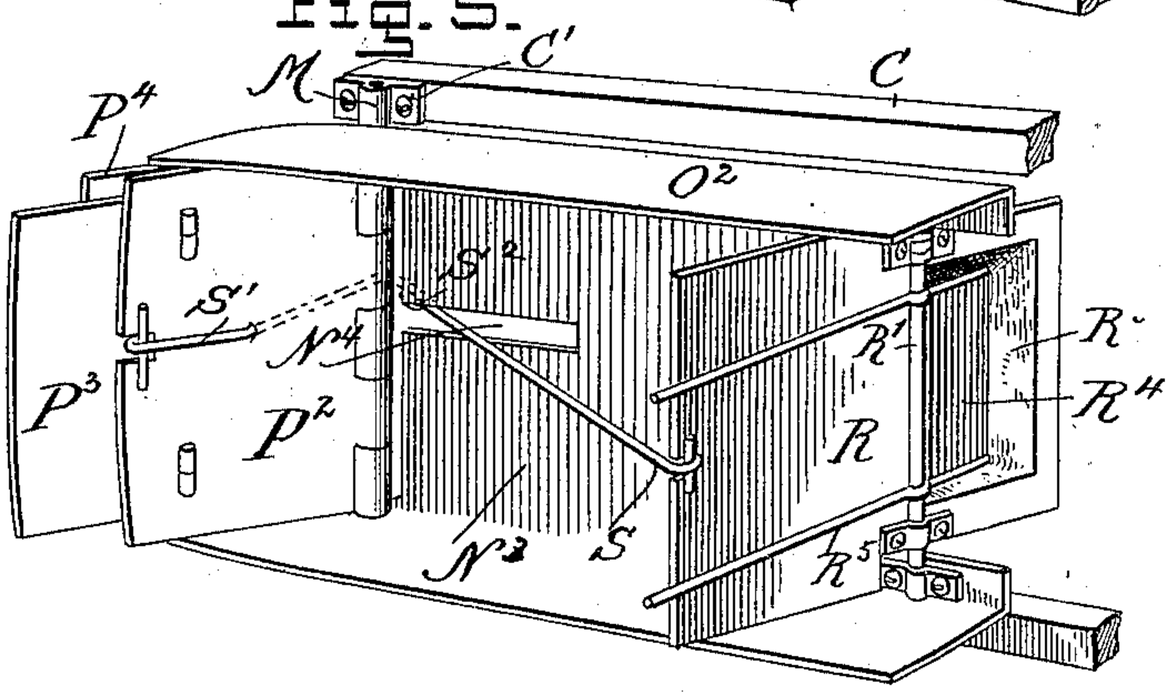

Fig. 6.

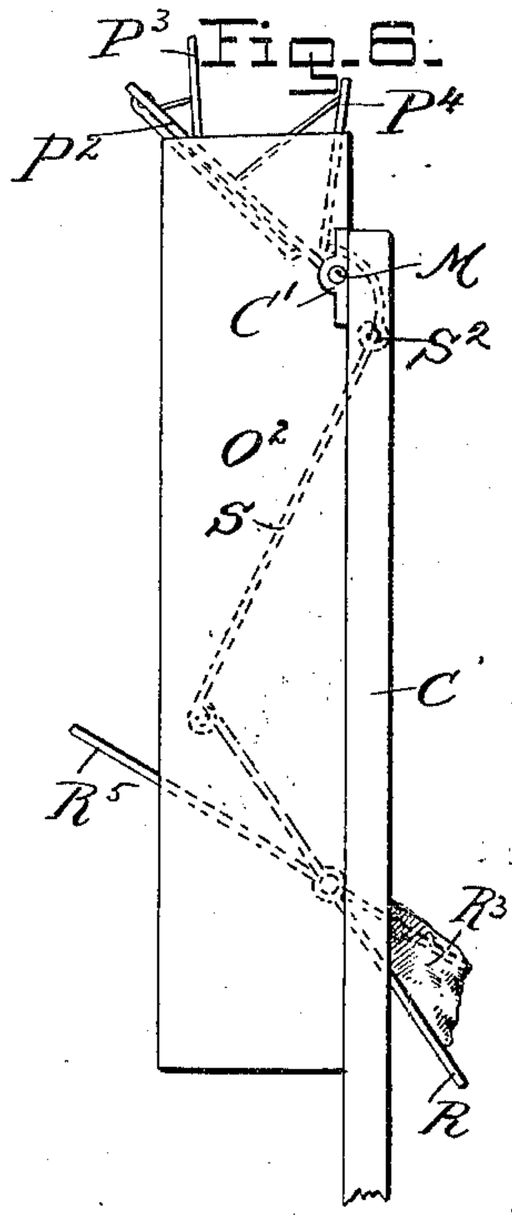

Fig. 7.

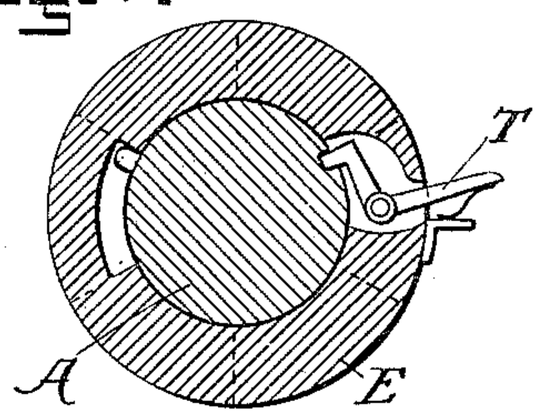

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Fig. 8.

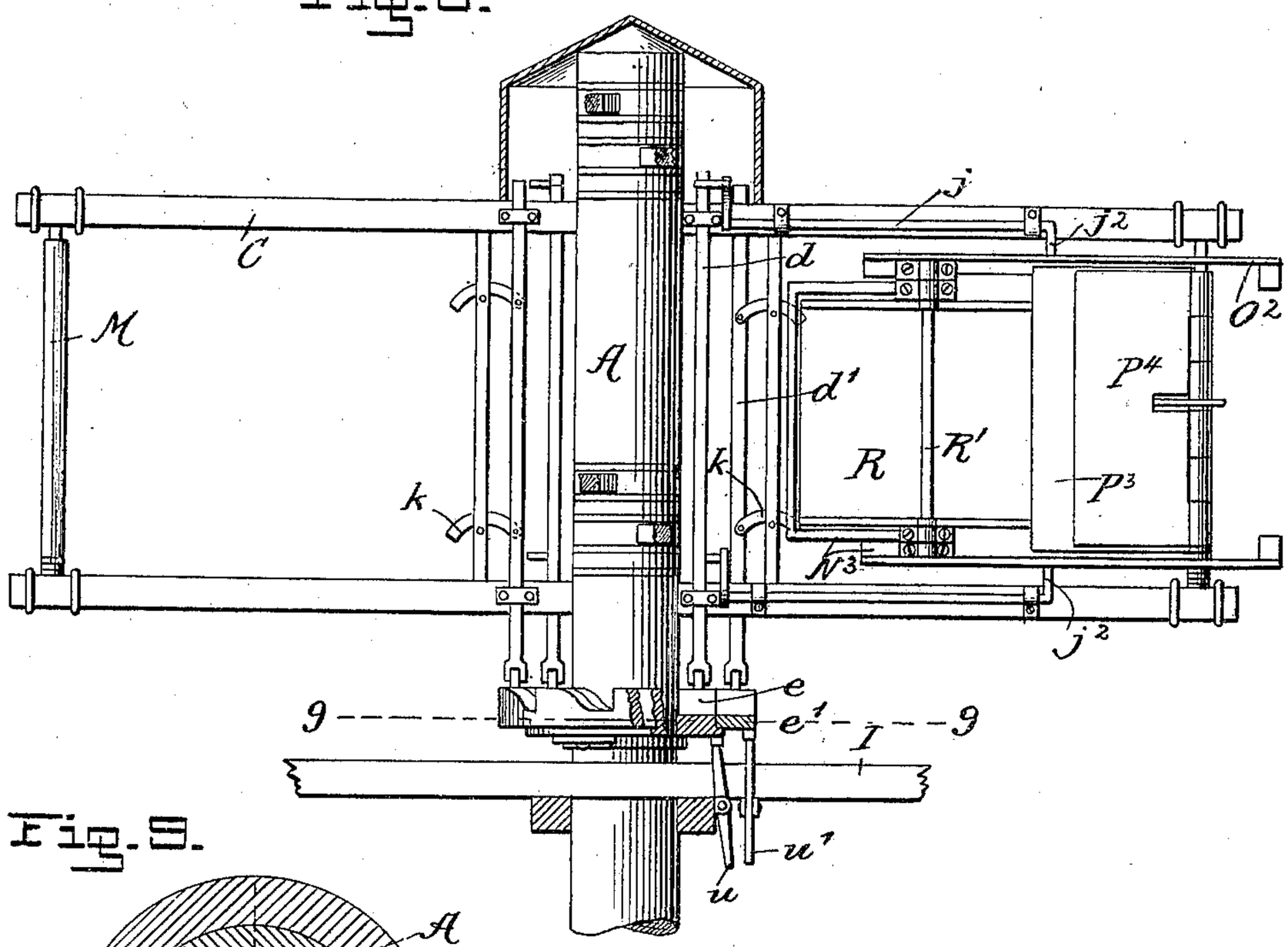
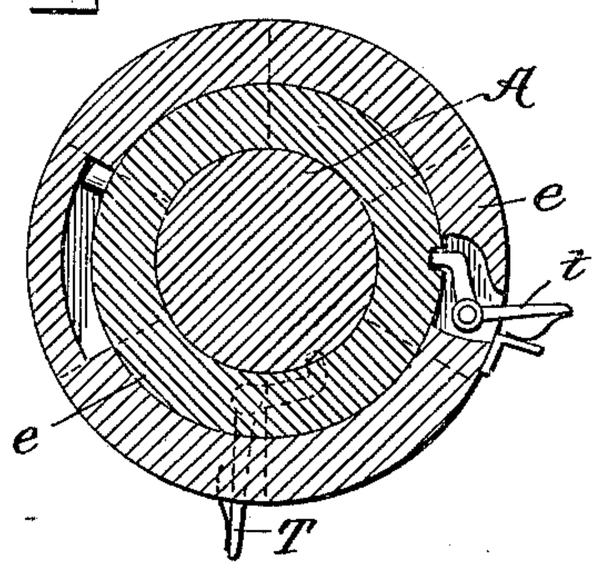


Fig. 9.



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UNITED STATES PATENT OFFICE.

MARCIN PUSZKAR, OF NEW YORK, N. Y.

CURRENT-MOTOR.

SPECIFICATION forming part of Letters Patent No. 662,737, dated November 27, 1900.

Application filed September 14, 1900. Serial No. 30,014. (No model.)

To all whom it may concern:

Be it known that I, MARCIN PUSZKAR, a subject of the Emperor of Russia, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and Improved Current-Motor, of which the following is a full, clear, and exact description.

My invention relates to motors adapted to be actuated by a moving fluid, such as wind or flowing water, and has for its object to provide a simple construction of this class which will require but little attention and which will be efficient in operation.

The invention will be fully described hereinafter and the features of novelty pointed out in the appended 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 views.

Figure 1 is a plan view of my improved current-motor. Fig. 2 is an elevation thereof with parts in section. Fig. 3 is a detail perspective view of one of the arms and its vane. Figs. 4 and 5 are perspective views illustrating another form of vane in the closed and open positions, respectively. Fig. 6 is a plan of this vane in the open position. Fig. 7 is a detail sectional plan on line 7 7 of Fig. 2. Fig. 8 is an elevation similar to Fig. 2 of the mechanism employed with vanes such as shown in Figs. 4 and 5, and Fig. 9 is a sectional plan on line 9 9 of Fig. 8.

My invention belongs to that class of motors or mills which rotate in a horizontal plane about a vertical axis and which have a series of rotating arms, to the outer ends of which the vanes are pivoted about vertical axes.

In the drawings, A designates the central vertical shaft, which is journaled in a suitable bearing B. To the shaft are rigidly secured a plurality of arms or frames C, six arms being shown in Fig. 1, and I prefer to arrange the arms at different heights, as indicated in Fig. 2, so that the vanes will project upwardly or downwardly beyond their neighbors, thus securing a better utilization of the wind or water current. The arms C are superposed in sets, as shown, and at their inner portions they carry vertical slide-bars D, the lower ends of which carry rollers D′, resting upon a ring E, which normally rotates with the shaft A. Each of the bars D has a projection D^2, adapted to be engaged by a normally-stationary but vertically-slidable ring F, connected by a spider or skeleton frame G with a lever H, fulcrumed at H′ upon a stationary frame I. The bars D are also loosely connected with crank-arms J′ upon the inner ends of horizontal shafts J, journaled upon the arms C, said shafts being provided at their outer ends with other cranks J^2, adapted to be projected between the arms C. Further, the bars D are pivotally connected with stops K, having sliding movement in apertures in rods L, which connect superposed arms C near their inner ends.

To the outer ends of the arms C are secured bearings C′, receiving vertical shafts M, on which are mounted the vanes. The latter are of such a length and width that when the cranks J^2 and stops K are withdrawn from the space inclosed by the arms C and the rods L the vanes will be perfectly free to swing about the shafts M as their pivots; but when the cranks J^2 and stops K are thrown in, as shown in Fig. 2, they will be in the path of the vanes, preventing the passage of the vanes between the arms.

Various constructions may be adopted for the vanes. They may be single plates of a suitable material, as wood or metal, or cloth (canvas) stretched on wire frames. I prefer, however, to provide the vanes with automatically opening and closing pockets, either as shown in Figs. 1, 2, and 3, or as illustrated in Figs. 4, 5, and 6. In the former construction the vane comprises a body consisting of a rectangular frame N, with a canvas cover N′ secured thereto. Pivotally attached to the frame N are side frames O, with a canvas cover O′, said frames being adapted to fold inward, (see Fig. 1,) and at the shaft M, journaled at the outer end of the arm C, as before stated, is attached an end frame P, covered with canvas P′ and adapted to fold inward over the side frames O. To limit the opening movement of the side frames O of the end frames P, I provide flexible connections, such as cords or wires Q, secured to said frames and to cross-rods N^2 of the main frame N. The cover N′ is sufficiently loose to form a bag-like fullness when exposed to the wind.

At the free end of the vane, on the side opposite the frame P, is hinged a balancing-frame p, covered with canvas p' and limited in its movements by wires q. In the second construction the main frame N is a plate of relatively stiff material, as sheet metal, and has rigidly attached to it side plates O^2, which therefore are not adapted to fold against the main frame. Upon the shaft M is pivotally mounted an end plate P^2, preferably provided on its outer face with one or more supplemental wings P^3 P^4, pivotally attached thereto at different points and having their outward movement limited in any suitable manner. At the free end of the vane is hinged, as at R', another end plate R, adapted to open on the opposite side to the plate P^2 and forming a balancing-plate, and the free end of the plate R is connected with the plate P^2 by means of a rod S, passing through a slot N^4 in the main plate N^3, and of another rod S', pivotally connected with the rod S at S^2, so that when one of the plates P^2 and R swings open the other is opened also. A portion R^3 of the plate R has a loose canvas panel, and to this is secured a plate R^4, having arms R^5 pivoted to the cross-bar R', the ends of the arms R^5 extending far enough to move the wing P^3 off the plate R.

The ring E, used in connection with vanes of the construction shown in Figs. 1, 2, and 3, has raised portions on which the rollers D' rest normally and intervening depressions E'. In the position shown in Fig. 2 the cranks J^2 and stops K are in the path of the vanes. If, however, the bars D are raised or lowered, the cranks J^2 and stops K will be withdrawn and the operation of the mill will be stopped, as will be fully explained hereinafter. By manipulating the lever H the ring F can be raised against the projections D^2, thus raising the bars D and stopping the motor until the lever is released to allow the ring F to resume its lower position. This is the operation generally adopted for temporarily stopping or checking the motor. For longer stoppages the rollers D' of the bars D are dropped into the depressions E' in the ring E. To do this the ring must be held stationary. For this purpose the ring E is normally held to rotate with the shaft A by means of a spring-pressed lever T, the inner end of which is adapted to enter an aperture in the shaft, (see Fig. 7,) while the outer end is adapted for engagement by a stop-lever U, pivoted to the frame I at U'. It will be understood that the ring E normally rotates with the shaft, and if the lever U is thrown in it will disengage the lever T from the shaft, rendering the ring E free, and a short rotary movement of the shaft relatively to the ring will cause the rollers D to drop into the depressions E', stopping the motor, as will be described presently. To then again start the motor it will be necessary to throw out the lever U and to turn the ring E on the shaft until the lever T again snaps into locking engagement with the shaft.

With the cranks J^2 and the stops K projected into the path of the vanes the operation is as follows: Assuming the current (wind or water) to flow in the direction indicated by the arrow in Fig. 1, the vanes on the right-hand side of the shaft A will be pressed by the current against the said cranks J^2 and stops K, so as to impart a rotary movement to the arms C and the shaft A and the covers N' will bulge out, so as to better catch the current. When the vanes approach a position in which they stand directly in the line of the wind, they are swung around on their pivots M, particularly by the action of the wind on the cover P'. This action is counterbalanced by the pressure of the wind on the cover p', thereby preventing the vanes from swinging around too early. Of course the space between adjoining arms is sufficient to allow for this swinging movement of the vanes. The vanes then range in the direction of the wind, the frames O, P, and p folding against the main frame N by the influence of the wind. As the left-hand side of the mill moves forward—that is, against the wind or water—the vanes present a narrow edge, and therefore little resistance to the current and automatically preserve a direction parallel with the current until they strike again the cranks J^2 and stops K, when the vanes resume their driving action. This operation would of course take place even with vanes in the form of simple plates or boards. The addition of side frames O and an end frame P at the pivot end of the vane, as in Figs. 1, 2, and 3, increases the efficiency by forming a pocket to better hold the wind or water, it being understood that the said frames automatically swing open while the vanes are driving and also close automatically on that side which turns against the current. The action of the current on the end frames P and on the balancing-frames p also materially assists in swinging the vanes on their pivots M at the right moment.

With the vanes constructed as in Figs. 4, 5, and 6 the side plates O^2 always remain open, but as they present their sharp edges to the current they offer but little resistance. The end plate P^2, with its supplemental wings P^3 P^4, performs the same function as the end frame P in Figs. 1, 2, and 3, and the plate R^4 will open first with the plate R, thereby lifting the wing P^3 through the medium of the arms R^5 and also opening the plate P^2 by means of the rod S. The plates R and P^2 open on opposite sides of the frame N^3, and thus balance the action of the current in substantially the same manner as the frames P p of the construction shown in Fig. 3, preventing a too early swinging of the vanes on their pivots.

The mechanism for starting and stopping the vanes may in this construction be the same as shown in Fig. 2. I prefer, however, the arrangement illustrated by Figs. 8 and 9, which provides ready means for reducing the power of the motor in case of an abnormal

strength of the current. According to this arrangement the stops *k* may be thrown out of action independently of the cranks j^2 or simultaneously therewith. The cranks j^2 are adapted to hold the frame N^3, and the stops *k* are arranged to come in engagement with the plate R, so that the latter may be prevented from opening, thus reducing the surface exposed to the current. If, however, the stops *k* are thrown into an inactive position, the panel R^3 and plate R will open fully and the motor will operate at full power. To secure this result, the cranks j^2 are controlled by bars *d* and the stops *k* by a separate set of bars *d'*. There is provided an inner ring *e*, constructed substantially like the ring E in Fig. 2 and connected with the shaft A in the same manner. *u* is the lever for disengaging the ring *e* from the shaft. This ring controls the bars *d*, connected with the cranks j^2. Another similar ring *e'* surrounds the ring *e* and controls the bars *d'*. This outer ring is normally held to rotate with the inner ring by means of a coupling-lever *t*, which may be thrown out by a stop-lever *u'*. Thus both rings may rotate with the shaft and hold the cranks j^2 and stops *k* in an active position, driving the motor at a reduced power. When full power is desired, the stop-lever *u'* is operated, holding the ring *e'* stationary for a moment and throwing the stops *k* out of action, while the inner ring *e* continues to rotate with the shaft. When it is desired to stop the motor, the stop-lever *u* is thrown in, whereby both rings *e* and *e'* are held stationary and the cranks j^2, as well as the stops *k*, brought into an inactive position.

It will be understood that various modifications may be made without departing from the nature of my invention as set forth in the appended claims.

It will be understood that the stopping device, consisting of the movable ring F, may be applied to the construction shown in Fig. 8. Furthermore, when the apparatus is operated by water, in which case the wings are partly or entirely submerged, it will generally be preferable to use the motor in an inverted position, so that the collars or rings E or *e e'* will be at the top—that is, above the water-level.

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

1. A current-motor comprising a plurality of arms connected to rotate in unison, vanes each having one end pivotally attached to the outer end of one of said arms, the vanes being adapted to swing on the arms freely, bars connecting said arms, stops having sliding movement on said bars and arranged to project into the path of the vanes to bring them into driving connection with the arms, bars mounted to slide on the arms and pivotally connected with said stops, and means for operating the sliding bars.

2. A current-motor comprising a plurality of arms connected to rotate in unison, vanes each having one end pivotally attached to the outer end of one of said arms, the vanes being adapted to swing on the arms freely, shafts extending longitudinally of the arms and carried thereby, said shafts having cranks arranged to project into the path of the vanes to bring them into driving connection with the arms, bars mounted to slide on the arms and operatively connected with said shafts, and means for sliding said bars.

3. A current-motor comprising a plurality of arms connected to rotate in unison, vanes each having one end pivotally attached to the outer end of one of said arms, the vanes being adapted to swing on the arms freely, stops movably secured to the arms and arranged to project into the path of the vanes, to bring them into driving connection with the arms, bars slidable transversely on said arms and operatively connected with the stops, a collar or ring normally engaging the ends of said bars and provided with alternating rises and depressions, means for normally compelling the collar to rotate with the arms, and a device for rendering the collar loose relatively to the arms.

4. A current-motor comprising a plurality of arms connected to rotate in unison, vanes each having one end pivotally attached to the outer end of one of said arms, the vanes being adapted to swing on the arms freely, stops movably secured to the arms and arranged to project into the path of the vanes, to bring them into driving connection with the arms, bars slidable transversely on said arms and operatively connected with the stops, a collar or ring normally engaging the ends of said bars and provided with alternating rises and depressions, a lever projecting from said collar and adapted to lock it to the arms, and a stop-lever arranged to engage the projecting portion of the lock-lever, to unlock the collar from the arms.

5. A current-motor comprising a plurality of arms connected to rotate in unison, and a series of vanes pivotally connected with said arms, each vane having a body or main plate and an end plate or flap adapted to fold thereon and pivotally connected with the vane at the pivot end thereof.

6. A current-motor comprising a plurality of arms connected to rotate in unison, and a series of vanes pivotally connected with said arms, each vane having a body or main plate, longitudinal side plates, and an end plate or flap adapted to fold on the main plate and pivotally connected with the vane at the pivot end thereof.

7. A current-motor comprising a plurality of arms connected to rotate in unison, and a series of vanes pivotally connected with said arms, each vane having a body or main plate, an end plate or flap adapted to fold thereon and pivotally connected with the vane at the pivot end thereof, a transverse plate hinged to the other end of the vane, and an opera-

tive connection between the end plate and the transverse plate.

8. A current-motor comprising a plurality of arms connected to rotate in unison, and a series of vanes pivotally connected with said arms, each vane having a body, an end plate or flap adapted to fold on one side of the body at the pivot end thereof, and a balancing-plate adapted to fold on the opposite side of the body at the free end thereof.

9. A current-motor, having a plurality of arms, connected to rotate in unison, and a series of vanes pivotally connected with said arms, each vane having at its pivot end a plurality of supplemental wings pivoted thereto.

10. A current-motor comprising a rotary frame, vanes pivoted thereto, a set of movable stops adapted to engage the vanes directly, supplemental flaps or wings pivoted to the vanes, another set of movable stops adapted to engage the supplemental flaps, and devices for throwing both sets of stops into or out of action, and an independent device for operating one set of stops only.

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

MARCIN PUSZKAR.

Witnesses:
JOHN LOTKA,
EVERARD BOLTON MARSHALL.