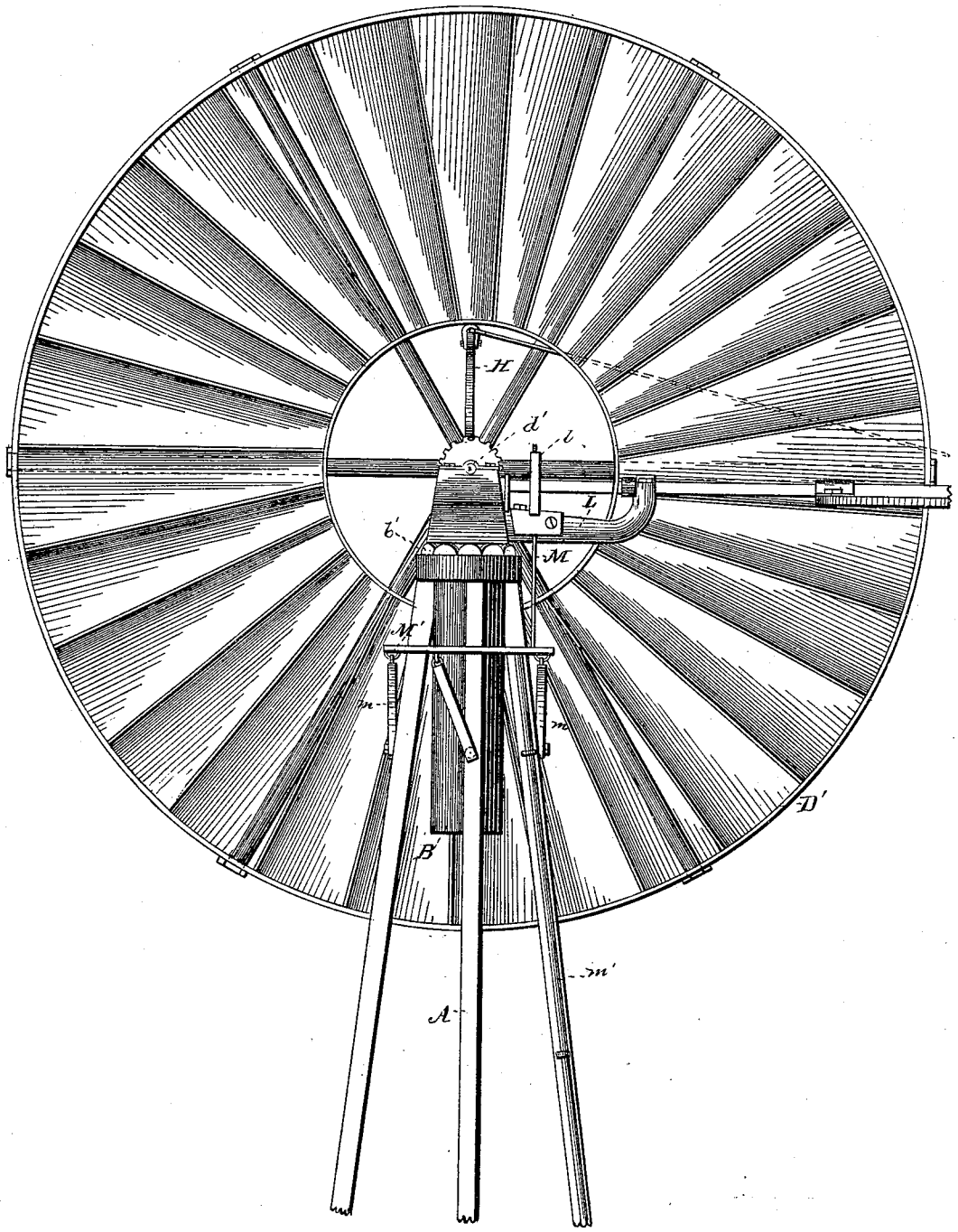
(No Model.) 4 Sheets—Sheet 1.

J. M. MACK.

WINDMILL.

No. 272,566. Patented Feb. 20, 1883.

Fig. 1.



WITNESSES

Chas. R. Burr

W. E. Bowen

INVENTOR

John M. Mack

per O. E. Duffy

Attorney

N. PETERS. Photo-Lithographer, Washington, D. C.

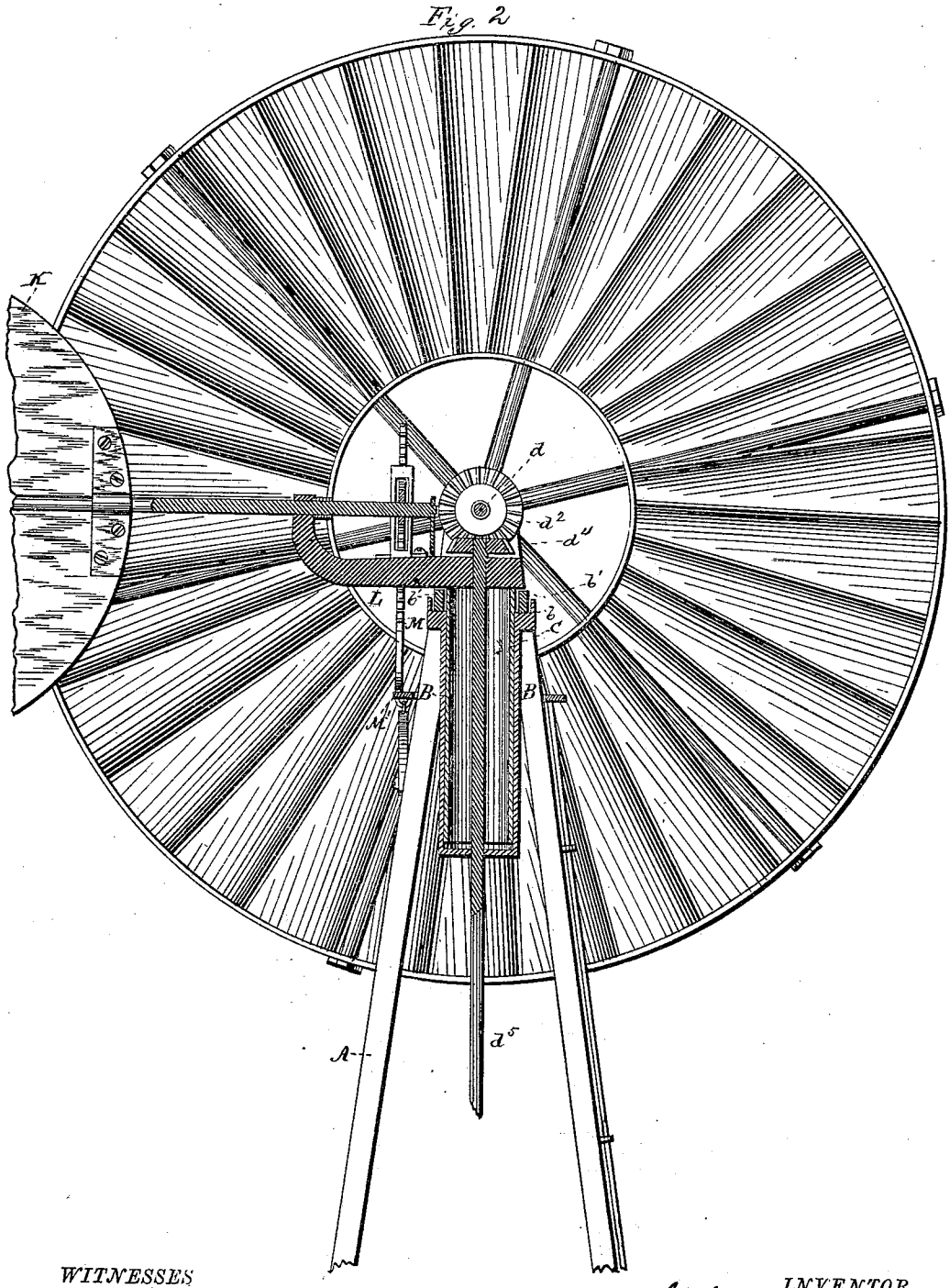
(No Model.) 4 Sheets—Sheet 2.

J. M. MACK.

WINDMILL.

No. 272,566. Patented Feb. 20, 1883.

Fig. 2



WITNESSES

Chas. R. Burr

W. E. Bowen

INVENTOR.

John M. Mack

per O. E. Duffy

Attorney

N. PETERS. Photo-Lithographer, Washington, D. C.

(No Model.)

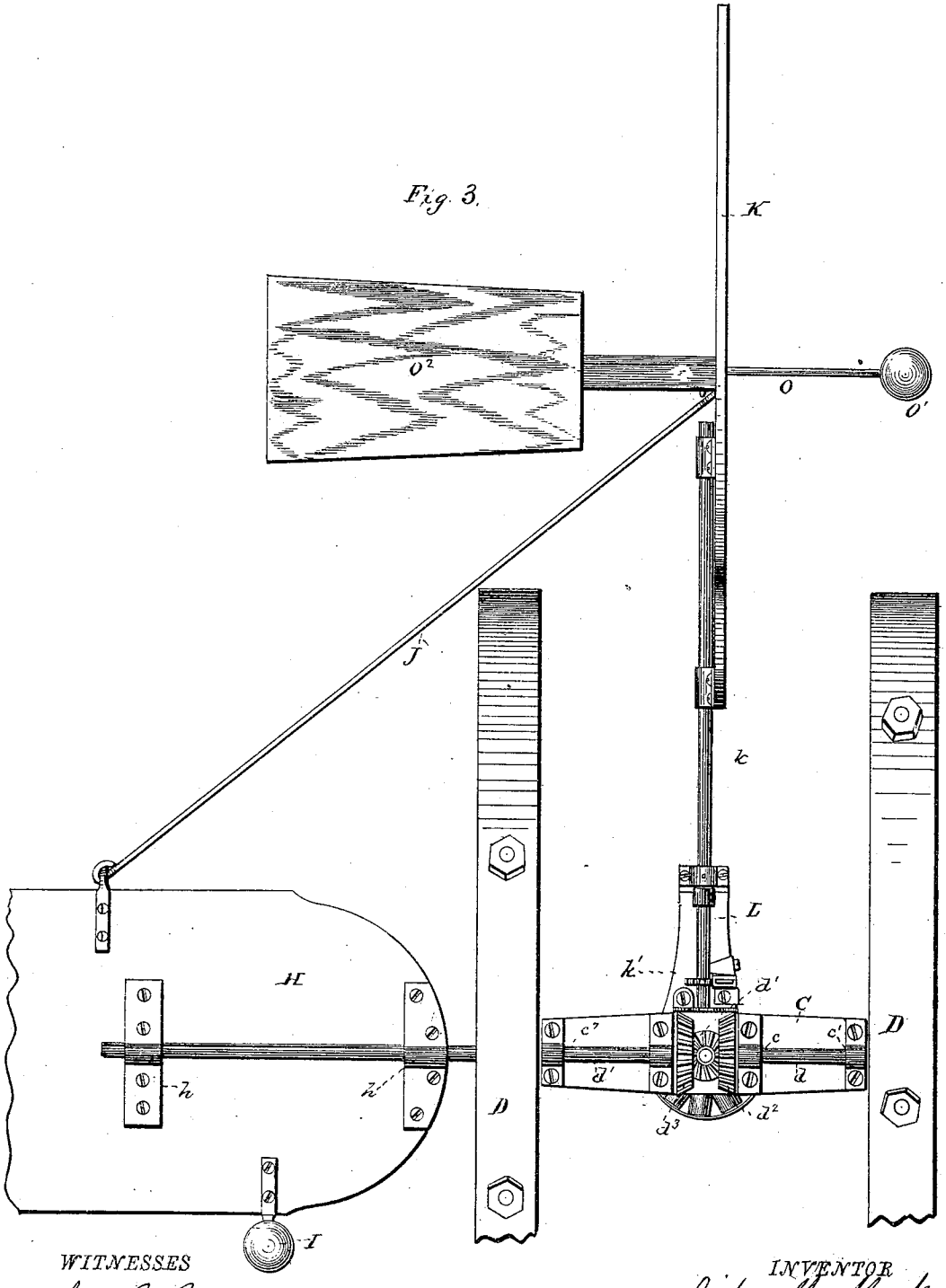
4 Sheets—Sheet 3.

J. M. MACK.

WINDMILL.

No. 272,566. Patented Feb. 20, 1883.

Fig. 3.



WITNESSES

Chas. R. Burr

W. E. Bowen

INVENTOR

John M. Mack

per O. E. Duffy

Attorney

N. PETERS. Photo-Lithographer. Washington, D. C.

(No Model.) 4 Sheets—Sheet 4.

J. M. MACK.

WINDMILL.

No. 272,566. Patented Feb. 20, 1883.

Fig. 4.

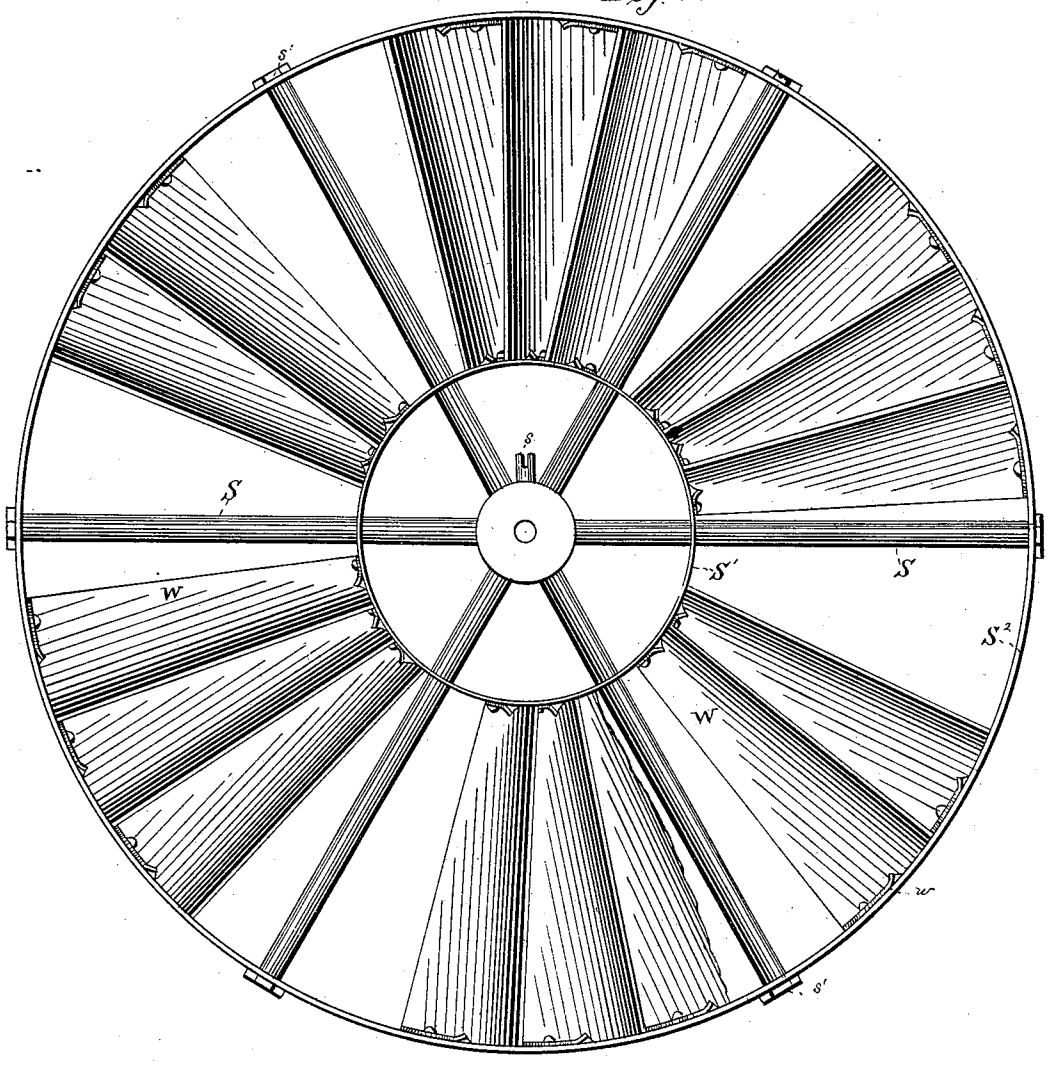
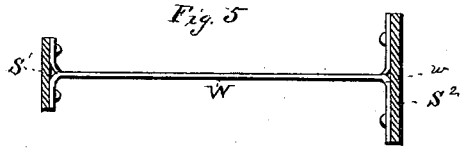


Fig. 5



WITNESSES
Chas. R. Burr
W. E. Bowen

INVENTOR
John M. Mack
per O. E. Duffy
Attorney

N. PETERS. Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

JOHN M. MACK, OF CEDAR VALE, KANSAS.

WINDMILL.

SPECIFICATION forming part of Letters Patent No. 272,566, dated February 20, 1883.

Application filed December 30, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOHN M. MACK, of Cedar Vale, in the county of Chautauqua and State of Kansas, have invented certain new and useful Improvements in Windmills; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

My invention relates to wind-engines; and the novelty consists in the construction and arrangement of parts, as will be more fully hereinafter set forth, and specifically pointed out in the claims.

The invention is fully illustrated in the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a side elevation; Fig. 2, a central vertical section; Fig. 3, a top plan view; Fig. 4, an elevation of one of the wheels with some of the plates removed; and Fig. 5, a detail view of one of the plates, showing its method of attachment to its bearings.

Referring to the drawings, in which similar letters of reference indicate like parts in all the figures, A represents an ordinary tower carrying a socket, B, having an annular recess, *b*, adapted to receive the friction rolls or ball *b'*.

C represents the casting or body, having downwardly-projecting shank *c*, which operates loosely in the socket B, its lower surface having a free bearing on the rolls *b'*. Journaled in the body C at *c'* is the revolving shaft *d* of the wind-wheel D, and similarly journaled at c^2 is the shaft *d'* of the wind-wheel D'. For convenience and for the better understanding of the case, the wheel D will be designated as the "front wheel," as it faces the wind when the vane is in operation, and the wheel D' will be called the "back wheel." The shafts *d* and *d'* are journaled in bearings and revolve with their respective wheels, and they are provided upon their inner extremities with beveled gears d^2 and d^3, both of which mesh with a similar gear, d^4, which is rigid with the vertical shaft d^5, which connects by crank or other device with the object to be operated. The shaft *d'* is considerably longer than the shaft *d* and extends rearward to form a support for the vane H, the said shaft *d'* being journaled in brackets *h*, secured upon said vane, as shown. It will thus be seen that not only is the vane H given free rotary movement on the shaft *d'*, but the said shaft is allowed to revolve freely in its journals upon the vane.

The vane H has a counter-weight, I, which acts with a constant force to keep the vane in a vertical position, and it is connected, from its upper edge, by a link, J, to the lower edge of a governor-vane, K, journaled at right angles to the bearings of the vane H. This link J is of such length that when the plane of the vane H is vertical the plane of the vane K is horizontal, and vice versa. The vane K, or governor, is hung upon a shaft, *k*, journaled in an arm, L, of the body C, and the said shaft *k* is provided with a pinion, *k'*, which meshes with a vertically-reciprocating rock-bar, M. This rock-bar M operates in a guide, *l*, and rests at its lower end upon a ring, M', which surrounds the tower, and is secured thereto by loose links *m*, which allow the ring to be raised or lowered at will by means of the rod *m'*. By means of this rod *m'* and its connections the vanes may be thrown into such position as to bring the wind-wheels into full operation, partial operation, or entirely out of operation, as occasion may require. In addition to this, however, the vanes are adapted to operate automatically to obtain operative medium. For this purpose the governor-vane K is pierced at or near its longitudinal and transverse center with an arm, *o*, extending from each side, the front arm carrying a counter-weight, *o'*, and the rear arm a vane, o^2.

It will be seen that as the vane H goes into operation to hold the wind-wheels into operating relation with the wind the governor-valve oscillates until the vane o^2 is acted upon by the wind, and afterward the vane H will receive more or less of the wind force as the vane o^2 or K is operated upon.

The wind-wheels are constructed as follows: The hubs of each are held rigid to the shaft by the set-screw *s*, and from the hub extend radiating arms or spokes S, which pass through an inner ring, S', and an outer or peripheral ring, S^2, a nut, *s'*, being placed upon the threaded outer end of said spokes. The inner ring, S',

is of much less width than the ring S^2, the difference being to accommodate the unequal widths of the outer and inner ends of the sails W. At or near the center of each end these sails are cut for a short distance, as seen at *w*, and the material is then turned in opposite direction and secured to the rings, as shown. This gives an increased bearing, readily and cheaply accomplished, and serves to hold the sails firmly in position. By loosening the nuts *s'*, the wheel may readily be taken apart for repair. It is important in this machine that the wheels revolve in opposite directions, the sails being arranged to effect that result, and it is of advantage that the wind which passes the front wheel should have its effect upon the back wheel. I deem the construction of the sails and their manner of being secured in the wheels as important.

I deem the vane H, hung upon the revolving shaft of one of the wind-wheels, in its relation to the governor and other parts of the device and the system of vanes and means for modifying their action, important.

What I claim as new is—

1. In a wind-engine, a wind-wheel having its sails formed with wide and narrow ends, cut centrally, and the material turned in opposite directions, forming flanges, the turned portions or flanges being secured to concentric rings S' S^2, as set forth.

2. The combination of the hub and spokes S, the rings S' and S^2, and the sails W, and fastening devices, whereby the wheel may readily be taken apart for transportation or repairs, or the like, as set forth.

3. The wheel D' and shaft *d'*, revolving together, combined with the vane H, hung upon said revolving shaft, the governor-vane, and connections, as set forth.

4. The vane H, hung upon the shaft *d'* of the wind-wheel D', and having counter-weight I, the governor-vane K, link J, and counter-vane *o' o²*, combined with the link J, shaft *k*, pinion *k'*, and means for modifying the action of said vanes at will, as specified.

5. The combination of the rod *m'*, ring M', and links *m* with the rock-bar M, pinion *k'*, rod *k*, vanes H K, and link J, as set forth.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

JOHN M. MACK.

Witnesses:
O. E. DUFFY,
B. F. MORSELL.