(No Model.)

2 Sheets—Sheet 1.

A. SHERWOOD.

WIND WHEEL.

No. 272,489. Patented Feb. 20, 1883.

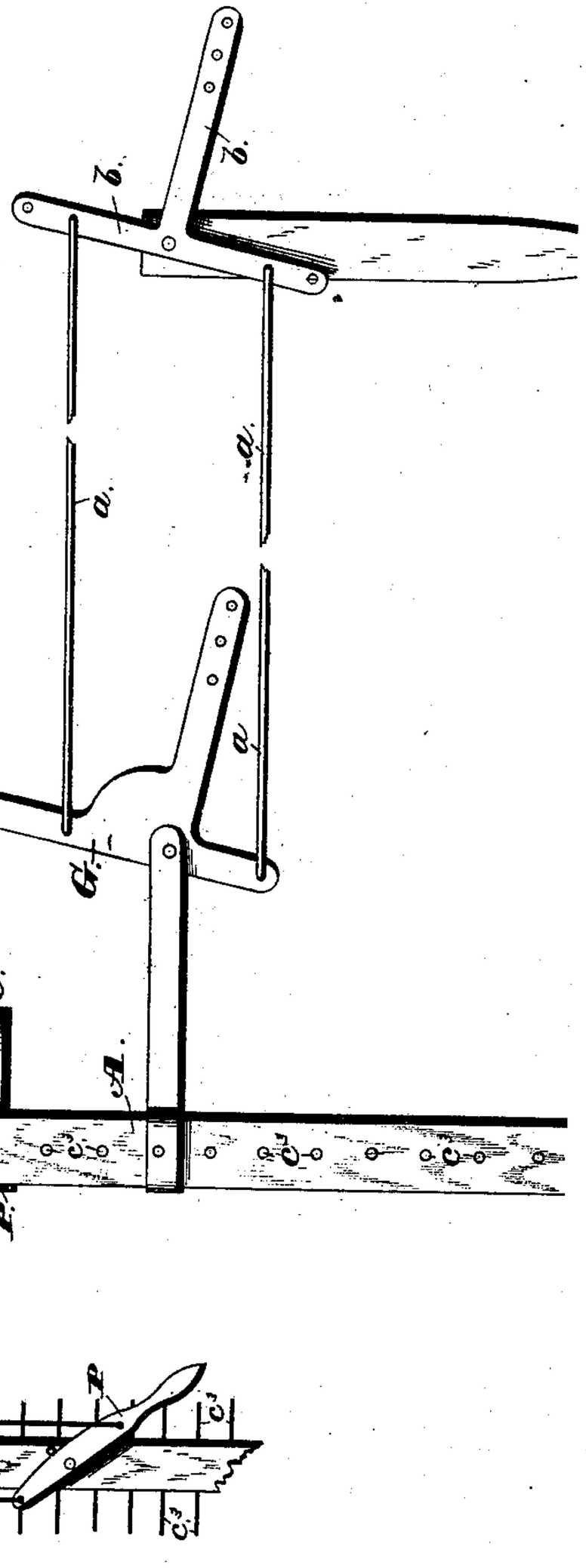

Fig. 1.

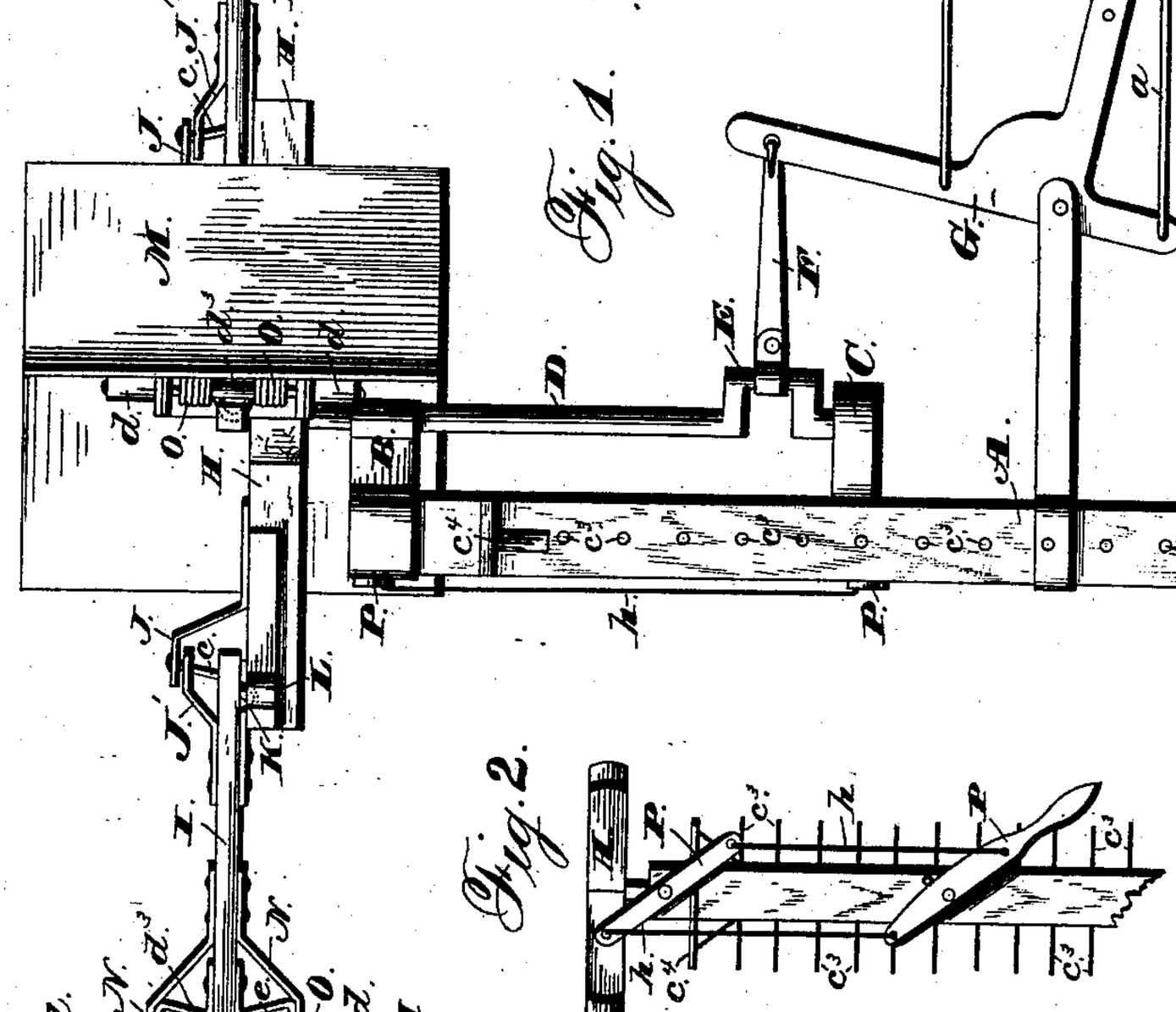

Fig. 2.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

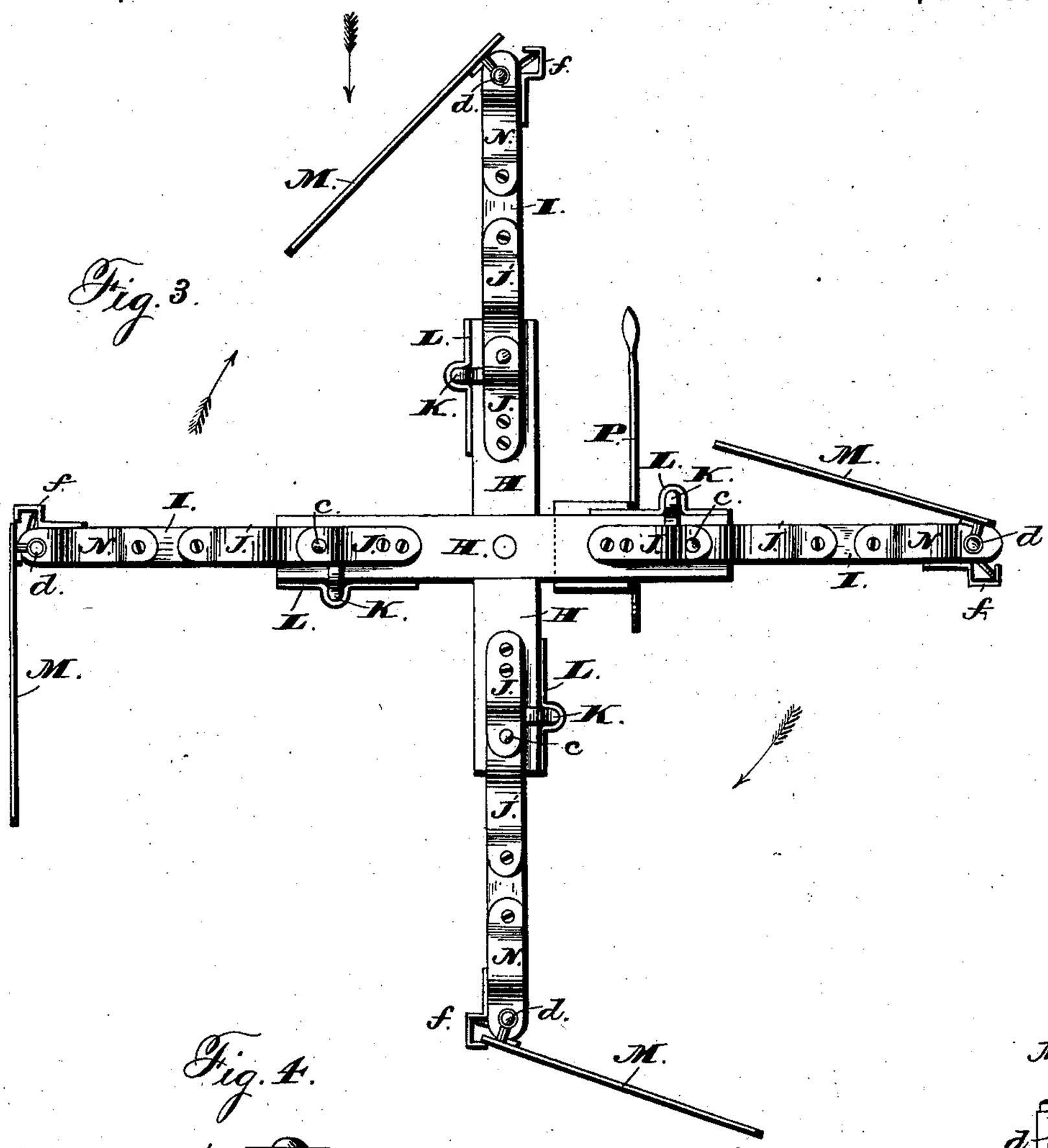


Fig. 4.

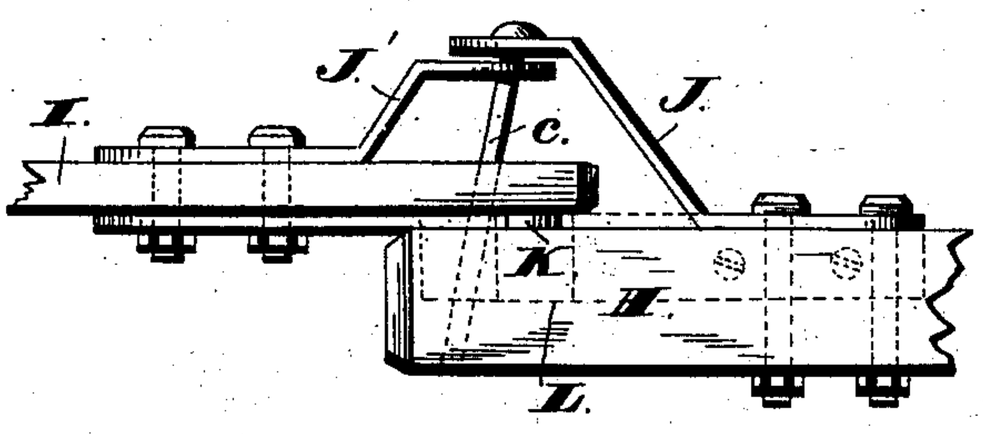
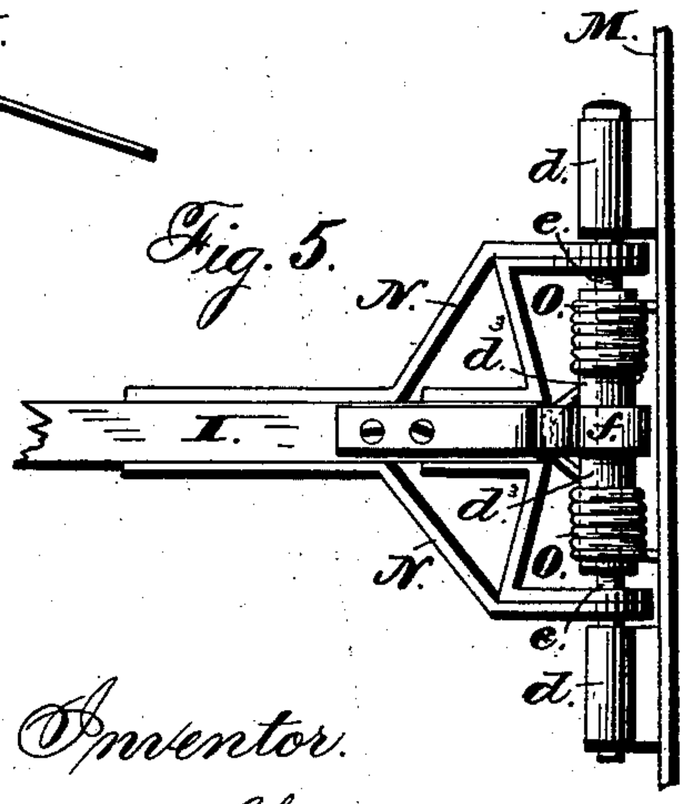


Fig. 5.



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UNITED STATES PATENT OFFICE.

ALVIN SHERWOOD, OF BURLINGTON, KANSAS.

WIND-WHEEL.

SPECIFICATION forming part of Letters Patent No. 272,489, dated February 20, 1883.

Application filed November 14, 1882. (No model.)

To all whom it may concern:

Be it known that I, ALVIN SHERWOOD, of Burlington, in the county of Coffey and State of Kansas, have invented certain new and useful Improvements in Wind-Wheels; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

My invention relates to an improvement in wind-wheels, and is designed more particularly as an improvement on Patent No. 244,677, granted to me July 19, 1881, the object of the same being to provide a machine with wings which regulate the speed of the machine by being automatically thrown out of the wind when the speed is too fast and automatically righting themselves as they come back to their original position.

With these ends in view my invention consists in the parts and combinations of parts, as will be more fully described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of my improvement. Fig. 2 is a plan view of the same. Fig. 3 is an enlarged detached view, showing the manner of connecting the rigid and hinged arms together. Fig. 4 is a detached view, showing the manner of securing the wings to the hinged arms. Fig. 5 is a detail view illustrating the connection of the wings to the movable arms.

A represents an upright standard, tower, or other suitable support, provided with the bearing B and the step C, and D a vertical wind-wheel shaft journaled in the bearing B and supported on the step C. This shaft D is provided above its lower bearing end with the crank E, to which one end of the pitman F is loosely secured. The opposite end of this pitman is secured to the upright arm of the bell-crank lever G, while the horizontal arm of the said bell-crank can be connected directly to a pump-rod, or to any machinery capable of receiving its motion from the wheel. A depending arm can be secured to the bell-crank below the vertical arm thereof, and by means of the rod *a* and the T-lever *b* motion can be transmitted to a pump or machinery situated a considerable distance from the wind-wheel. When this standard is secured to a building the shaft runs through the step, and is squared at its lower end for the attachment of another shaft, which latter extends down as far as necessary. This lower shaft can be provided with a crank and wheel or gear-wheels for imparting the necessary motion to the machinery it is intended to drive. The standard is also provided with the steps or rungs c^3 for ascending to a suitable scaffold, c^4. This scaffold is situated below the arms of the mill, and is for convenience in oiling the parts.

To the upper end of the shaft D the radial arms H are rigidly secured. These arms—two or more in number—are connected together at right angles by lap-joints, and the end of the shaft passes upward through this joint, and, as before stated, is rigidly secured therein in any desired manner. These arms crossing each other centrally form four or more radial arms, to the outer ends of which the arms I are loosely secured by means of the pins *c*. Each rigid arm is provided on its upper surface with a bracket, J, made of metal or wood, as desired, which latter, together with the rigid arms, are adapted to form between them bearings or supports for the inner ends of the hinged arms I. These hinged arms I are each also provided with a bracket or bearing-piece, J′, adapted to bear against the inner face of the bearing-piece J of the rigid arms, and consequently increase the bearing-surface of the hinged arms and strengthen the joint or connections between the said rigid and hinged arms. Each hinged arm is provided with a laterally-extending rigid finger, K, adapted to engage the curved spring-lock L of the rigid arm H and hold the two under ordinary circumstances in the same radial line. These springs are constructed to withstand a certain amount of strain or pressure, and when this given amount is exceeded the springs will yield and allow the hinged arms to swing around with the attached wings out of the direct action of the wind. A space of about two inches is left between the tops of the brackets J and J′, and the pins *c* are passed through the said brackets and arms in an inclined direction, as shown. Thus it will be seen that when the wind is sufficiently strong to unlock the hinged arm from the rigid arm the said hinged arm will not move around in horizontal line, but will be moved around in an inclined direction upward—that is to say, the outer end of the hinged arm will be in a

higher horizontal plane than the inner end thereof, and as soon as the pressure of the wind against the inclined hinged arm is relieved the said arm will turn on its pivot-pin *c* by gravity alone, and will automatically lock itself in position; but I do not confine myself to this latter construction, as it is evident that the pins *c* can pass vertically through the brackets and arms instead of at an inclination, and when thus constructed, when the wind is sufficiently strong to unlock the parts, the hinge remains unlocked until so turned that the wind will act on its rear face, when it is forced backward and again becomes locked to the rigid arm. This operation or movement takes place on all the arms, and the mill is consequently prevented from rotating too rapidly.

To the outer ends of the hinged arms the spring-actuated wings M are pivotally secured. These wings can be made of sheet metal, wood, or a frame covered with canvas, and answer all the necessary purposes. The outer end of each hinged arm is provided on its upper and lower surfaces with the brackets or bearing-pieces N, which latter are adapted to rest between the rearwardly-projecting bearing-pieces *d* of the wings and form an extended bearing or connection between the parts. The wings are secured to the hinged arms by the pins *e*, and the latter are encircled between the bearing-pieces on the upper and lower faces of the hinged arms by the springs O. These springs are each provided with a central rearward extension adapted to move between the end of the arm and the rigid strike *f* and two end extensions, which pass forwardly and bear against and are secured to the rear face of the wings. Each spring O is provided with a wooden core or roller, d^3, which latter is situated longitudinally within the coils of the springs, and through which the pivot pins or bolts pass. These cores hold the springs in position, add to their strength, and prevent them from bulging at one side and becoming distorted in shape after constant usage. The wings, when in operation, follow or come behind the hinged arm, and when the wind is sufficiently strong to overcome the tension of the springs O they rest close up against the said arms. Each wing is allowed to swing from a position at right angles to the arms half the distance inward toward the said arm, or one-eighth of a circle, without bringing the springs into operation; but, as before stated, when the wind is strong enough the tension of the springs are overcome and the wings rest up against their respective arms.

For the purpose of illustrating the movement of the wings during one revolution of the wheel, we will suppose the wind is coming direct from the north, and one arm has just turned from the north and revolving toward the east. As soon as the wind strikes the wing on this arm it forces it in toward the arm and holds it against or near to the said arm until the wing turns from the south to the west, when the wind getting in between the arm and wing forces the wing outward to a position at or beyond a right angle to the arm. While the wing is in this position the wind still acts on it and assists materially in turning the wheel. As this wing gets around to the west it still stands about quarter-face to the wind until it passes from west to the north, where the edge thereof is presented until it gets to the starting-place, where a full face is again presented.

From the foregoing it will be seen that with a four-winged mill three of the wings are constantly exposed to the full force of the wind, while the remaining one is presented edgewise thereto, and consequently offers but little resistance to the free rotation of the wheel.

If desired, the springs O between the wings and hinged arms and the stops can be dispensed with; but I prefer to use the springs shown and described, as they keep the wings thoroughly under control and add to the power of the mill and prevent them from being damaged by shocks caused by the sudden opening and closing of the wings against the hinged arms.

It is apparent, also, that numerous yielding locking mechanisms for holding the hinged arms in proper relative position on the rigid arms can be devised without departing from the spirit of my invention.

To the standard, on the side opposite the vertical shaft, I have provided means for stopping and locking the wheel when it is not desired for use. This mechanism consists of two levers, P, pivoted to the standard in the position shown. These levers are connected together by the ropes or wires *h*, and by grasping the handle of the lower lever and moving it down the opposite end of the upper lever is forced upward, so as to project or rest between the rigid arms H. When this upper lever is tilted or inclined, as described, it forms an abutment for the following rigid arm and stops the movement of the wheel. By simply placing a pin or plug above or below the lower lever and to one side or the other of its pivot-pin the said levers will be held in an elevated or depressed position, and consequently lock the wheel or leave it free to revolve.

It is evident that numerous changes in the construction and relative arrangement of the several parts of my improvement might be resorted to without departing from the spirit of my invention, and hence I would have it understood that I do not limit myself to the exact construction shown and described, but consider myself at liberty to make such changes and alterations as fairly fall within the spirit and scope of my invention.

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

1. In a windmill having a horizontal wind-wheel, the combination, with the shaft D, rigid arms H, movable arms I, pivoted to said rigid arms, and the rigid wings M, pivoted to said movable arms, of the spring locking devices, arranged to normally hold the movable arms

in line with the rigid arms and permit them to swing back under stress of wind, and the springs, arranged to hold the wings to the wind and also permit them to be turned back on the movable arms in a horizontal direction, substantially as set forth.

2. The combination, with the rigid arms, the movable arms pivoted thereto, and the spring-locking devices, arranged to hold the movable arms in line with the rigid arms, and also to permit said movable arms to swing back and to become released, substantially as described.

3. The combination, with the rigid arms H and movable arms I, and suitable bearing-pieces, of the inclined pin forming the pivot between said arms, substantially as described, and for the purpose set forth.

4. The combination, with the standard and radial rigid arms of the wind-wheel, of break or locking devices arranged to be interposed between two of said arms and form a positive stop for the wheel, substantially as described.

5. The combination, with the movable arms having the bracket or bearing pieces N projecting from opposite sides thereof, of the wings having the bearing-pieces *d*, the pivot *e*, the springs O, surrounding said pin and having a looped portion bearing against the end of the movable arms and bent ends bearing against the wings, substantially as described.

6. The combination, with the rigid arms, each provided with spring-lock, of the movable arms, each provided with a laterally-projecting finger adapted to engage said spring-lock for the purpose described, and wings secured to the outer ends of the movable arms.

7. The combination, with the standard, vertical shaft, and radial arms, of the levers P and connecting-cords *h*, all of the above parts combined and adapted to operate as described.

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

ALVIN SHERWOOD.

Witnesses:
G. I. HARVEY,
ED. CLIMER.