

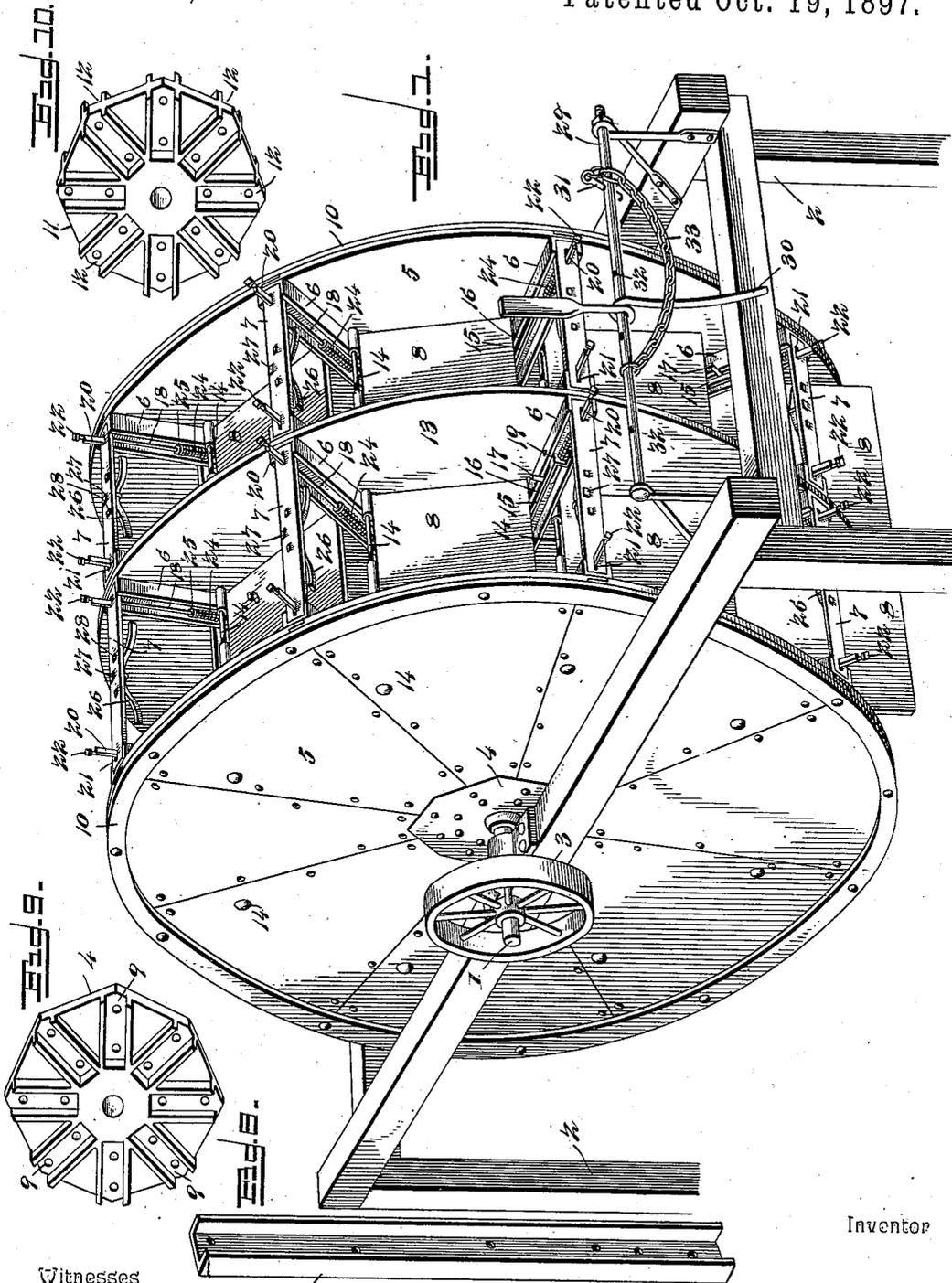
(No Model.)

3 Sheets—Sheet 1.

S. CROCKER.
AIR OR WATER WHEEL.

No. 592,080.

Patented Oct. 19, 1897.



Inventor

Witnesses

E. Stewart
V. B. Hillyard.

By *his* Attorneys, *Samuel Crocker*

Chas. Snow & Co.

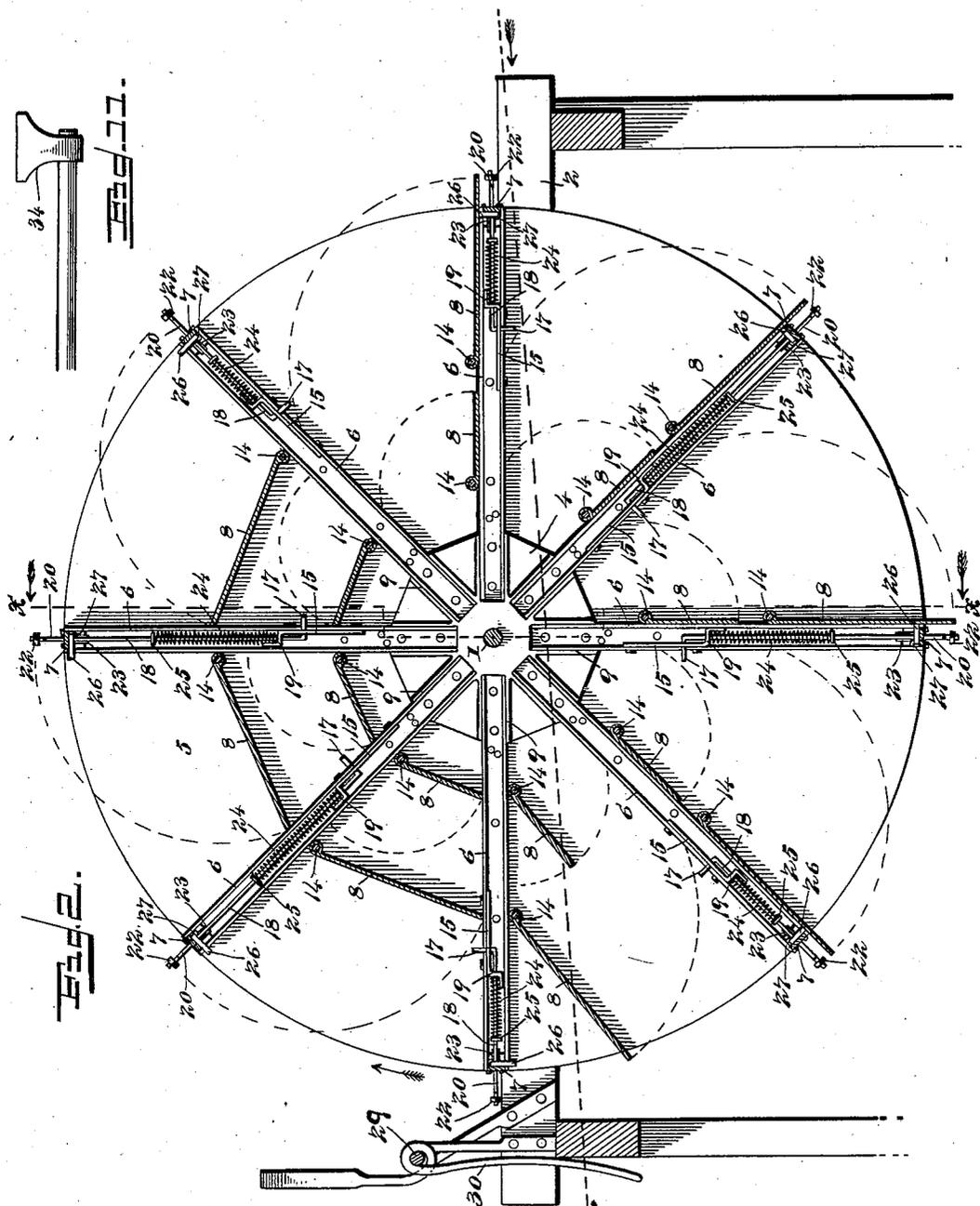
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By *Two* Attorneys,

Chas. Snow & Co.

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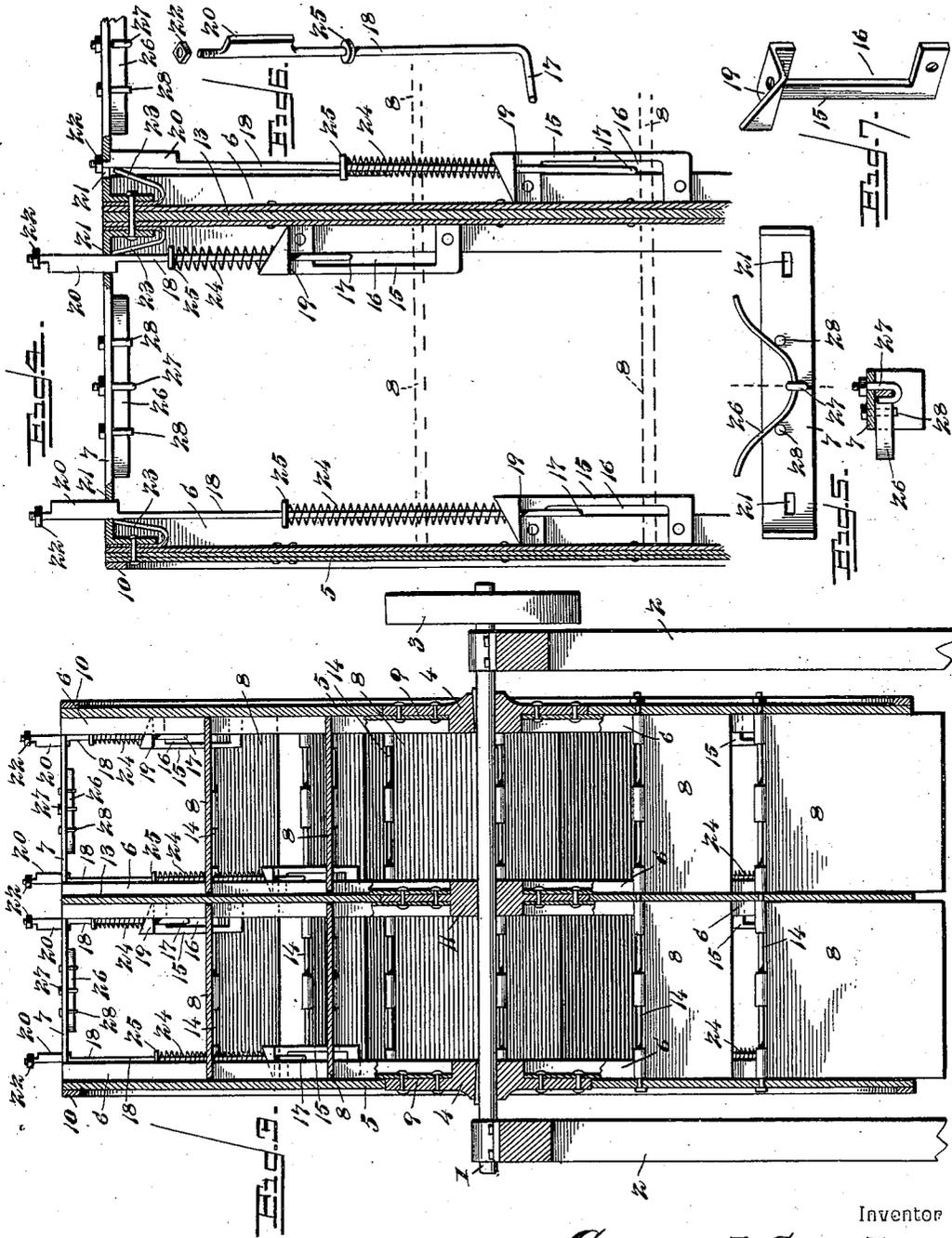
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Witnesses

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By *W. S.* Attorneys.

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UNITED STATES PATENT OFFICE.

SAMUEL CROCKER, OF OKLAHOMA, OKLAHOMA TERRITORY.

AIR OR WATER WHEEL.

SPECIFICATION forming part of Letters Patent No. 592,080, dated October 19, 1897.

Application filed October 17, 1896. Serial No. 609,237. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL CROCKER, a citizen of the United States, residing at Oklahoma, in the county of Oklahoma and Territory of Oklahoma, have invented a new and useful Air or Water Wheel, of which the following is a specification.

This invention relates to power-wheels which are adapted to be operated by currents of fluid or air, and the principal object is to convert a maximum percentage of the force of the current into useful energy for industrial purposes, and to this end the paddles are mounted so as to float or feather, whereby when returning to an active position they will offer a minimum amount of resistance to the passage of the current by the wheel.

A further purpose of the invention is to provide means for locking one or more of the paddles, whereby the effective force of the wheel may be varied or the wheel brought to a standstill when all the paddles are secured in an inoperative position. By this means the power of the wheel can be regulated to suit the load or work for which the wheel is required.

A still further purpose is to devise a simple and effective means for effecting a locking and releasing of the paddles without necessitating the stopping of the wheel when it is in operation, said means being wholly under the control of an attendant and adapted to be operated for securing any one or more of the paddles in an inactive position.

Objects and advantages other than those herein noted are contemplated and will suggest themselves to those skilled in the construction and operation of power-wheels of this class, and to this end reference is to be had to the following description and the accompanying drawings.

The improvement is susceptible of various changes in the form, proportion, and the minor details of construction without departing from the principle or sacrificing any of the advantages thereof, and to a full disclosure of the invention an adaptation thereof is shown in the accompanying drawings, in which—

Figure 1 is a perspective view of a power-wheel of special construction embodying the principles of this invention. Fig. 2 is a vertical section thereof. Fig. 3 is a transverse

section on the line xx of Fig. 2, looking in the direction of the arrow. Fig. 4 is a detail section showing more clearly the relation of the locking devices and one of the latter holding a paddle out of working position. Figs. 5 are detail views of a stay-bar as seen from the inner side and in transverse section. Fig. 6 is a detail view of a lock-bar. Fig. 7 is a detail view of a guide for the inner end of a lock-bar. Fig. 8 is a detail view of a radial arm. Fig. 9 is a detail view of an end hub. Fig. 10 is a detail view of an intermediate hub. Fig. 11 is a detail view of a different means for operating the lock-bars.

Corresponding and like parts are referred to in the following description and indicated in the several views of the accompanying drawings by the same reference-characters.

The power-wheel is of the undershot type and in practice will be mounted as found most convenient according to the location, the surrounding conditions, and the character of current-power, whether liquid or air. It will be also understood that the wheel may be single, double, or increased according to the power required, and that it may have a single row of paddles or more if desired. In the drawings the wheel illustrated is double, and the paddles are provided in two series or tiers, an outer and an inner series.

The shaft 1, upon which the wheel is mounted, is shown journaled in bearings applied to a framework 2 of ordinary construction, and is provided at one end with a band-wheel 3, by means of which the power is transmitted to the machine or part to be operated by means of the ordinary drive-belt.

The wheel comprises, essentially, end hubs 4, heads 5, radial arms 6, secured at their inner ends to the hubs and having the heads fastened thereto, stay-bars 7, connecting the outer ends of corresponding arms 6, and paddles 8, the latter being hinged at their inner ends and operating between the heads and supported against the force of the current by the arms 6.

The hubs 4 are secured to the shaft 1 in any substantial manner and may be of desired form, the perimeter being composed of a series of straight edges against which the inner ends of the segmental sections comprising the heads 5 abut, and these hubs are

formed on their inner faces with radial seats 9, into which the inner ends of the arms 6 are fitted and secured by being bolted or riveted thereto, the seats 9 being formed between parallel flanges or ribs. The arms 6 have flanges at their longitudinal edges, thereby enabling them to be comparatively light and sufficiently stout to resist lateral pressure. The heads 5 are constructed of segmental sections having their meeting edges halved together and bolted or otherwise fastened to the arms 6. To give stiffness and rigidity to the heads, the latter are reinforced by rings or bands 10, made fast to their peripheral edge portion. When the wheels are to be duplicated or provided in series, the intermediate hub or hubs 11 are constructed substantially like the end hubs 4, the only difference being that both faces are provided with seats 12, corresponding to the seats 9, in which the intermediate arms are secured similar to the arms applied to the seats 9, and the intermediate partition 13 is secured between companion arms, as clearly indicated in the drawings.

The paddles 8 are hinged at their inner ends to rods 14, supported at their ends in the heads 5, and are of a width to fit snugly between the heads without binding when turning upon the rods 14, and these paddles are of a length to reach from one set of arms to the other when folding backward upon leaving the power-current. When in an operative position, the edge portions of the paddles bear against the flanges of the arms adjacent to the rods upon which the paddles are mounted, said flanges forming stops to sustain the paddles against the action of the current when the latter is impelling the paddles forward.

Guides 15 are secured to the arms 6 and consist of plates having an intermediate edge portion cut away, as shown at 16, which forms a space with the edge of the arms in which the bent end 17 of the lock-bars 18 operates. An outer end portion of the plates is bent, as shown at 19, and is apertured for the inner end of the lock-bars to operate freely therethrough. The outer end of the lock-bars is flattened, as shown at 20, and operates in elongated openings 21 near the ends of the stay-bars, and the outer extremities are threaded and receive nuts 22, which form stops to limit the inward movement of the lock-bars. Springs 23, of substantially V form, have their outer members secured between the bent ends of the stay-bars 7 and the outer ends of the arms 6, and their inner members exert a lateral pressure against the outer ends of the lock-bars, so that when the latter are moved inward to cause the flattened portion 20 to clear the inner side of the stay-bars the said lock-bars will be moved laterally to cause the ends of the flattened portions 20 to engage with the stay-bars and hold the lock-bars in their withdrawn position against the tension of springs 24, mounted

thereon and confined between stops 25, applied to the lock-bars and the outer ends 19 of the guides 15. The stops 22 limit the inward movement of the lock-bars and form projections to be engaged when it is required to move the lock-bars laterally, so as to disengage the ends of the flattened parts 20 from the stay-bars. At this instant the springs 24, regaining themselves, will move the lock-bars outward and withdraw their inner ends 17 from engagement with the paddles and permit the latter to automatically return to a normal or working position at the proper time. It will be understood that a lock-bar is provided for each paddle, and when the paddles are supplied in tiers or series the lock-bars will be of different length, so that their inner ends 17 will reach and engage with the respective paddles when it is required to hold them against movement into an operative position. The parts are so disposed that when the flattened ends 20 of the lock-bars are projected their inner ends 17 will be withdrawn from the path of the free ends of the paddles, and when the lock-bars are pushed inward their ends 17 will engage with the paddles and hold them inactive and out of working position.

As previously stated, the power-wheel is of the undershot type, and the paddles are disposed so that as they ascend from the current they turn to accommodate themselves to the current and offer a minimum amount of resistance to the forward movement of the wheel, and these paddles as they approach a working position to again enter the current return to an operative position to receive the force of the current and transmit the same to the wheel, from which the power is taken in the ordinary way, as previously stated. In order to prevent the jar and noise resulting from the paddles striking the arms, a bow-spring or buffer 26 is applied to each stay-bar and is secured thereto at a middle point by a clamp or hooked bolt 27, passing through an opening in the stay-bar and having a nut at its threaded end. Pins 28 are provided on the stay-bar equidistant from the fastening 27 and out of line therewith, and hold the buffer-spring in position to receive the impact of the paddles when the latter assume a working position. The terminals of the spring 26 project beyond the plane of the stay-bars and the adjacent arms, so as to receive and cushion the blow of the paddles. A cross bar or rail 29 is located within convenient reach, and a lever 30 is mounted thereon to be grasped when it is required to operate the lock-bars, and this lever is adapted to slide, tilt, and rock upon the rod 29 to enable its active end to be projected within the path of the lock-bar to be operated upon. For moving a lock-bar inward the lever 30 is adjusted so it will engage with the outer end of the lock-bar and push the latter inward against the tension of its spring 24, and when the end of the flattened part 20 clears the inner side

of the stay-bar the spring 23 will move the lock-bar, so as to cause the outer end of the part 20 to engage with the inner side of the stay-bar and thereby hold the inner end 17 of the lock-bar against the paddle and prevent the latter from returning to a working position. To release the lock-bar, the lever 30 is adjusted so its side will strike against the inner edge of the nut 22 and move the lock-bar outward, so as to disengage the end of the part 20 from the stay-bar, when the spring 24, regaining itself, will move the lock-bar outward and thereby release the paddle previously locked. The position of the lever 30 is fixed by means of a pin 31 thrust through one of a series of openings 32 in the rod 29, and in order to prevent the loss of the pin 31 a short chain 33 is attached thereto and an end link is slipped upon the rod 29. Instead of the lever 30 a hammer 34 may be employed, as shown in Fig. 11, the hammer being used in a manner similar to the lever 30.

When the wheels are duplicated, as shown in the drawings, or provided in series, the paddles may be arranged to aline transversely or to alternate, and in the latter case the seats on one side of the intermediate hub will be disposed opposite the spaces between the seats on the other side. This arrangement of the paddles may be advantageous under some conditions, and is contemplated within the scope of the invention.

Having thus described the invention, what is claimed as new is—

1. In a power-wheel, the combination of radial arms, paddles bearing at their edges against the arms and held in working position thereby, and hinged at their inner ends and of a length to engage with the adjacent arms when out of action, and independently-operated locking means for each paddle acting jointly with the arms to hold any desired paddle or paddles out of action, substantially as and for the purpose set forth.

2. In a power-wheel, the combination of radial arms, an inner and an outer series of paddles supported at their edges by the arms and pivoted at their inner ends, and of a length to extend across the space between adjacent arms when out of action, and independently-operated locking means for each series of paddles and for the several paddles of the series to admit of either series of paddles or any paddle or number of paddles of the series being held out of action and released when desired for service, substantially as set forth.

3. In a power-wheel, the combination of a hub having radial seats, arms having their edges flanged and secured at their inner ends in the seats of the hub, a head composed of sections which are secured to the arms, a reinforcing ring or band applied to the peripheral edge portion of the head, and paddles limited in their movement and supported in a working position by the flanged edges of the arms, substantially as set forth.

4. In a power-wheel, the combination of ra-

dially-disposed arms, heads secured to the arms, stay-bars connecting the arms at their outer ends, rods connecting the heads a distance from their edges, paddles mounted upon the said rods, and springs secured to the stay-bars intermediate of their extremities and having their end portions projecting to receive the impact of the paddles, substantially as described.

5. In a power-wheel, the combination of hinged paddles, stay-bars, substantially bow-shaped springs applied to the stay-bars, clamps connecting the springs at a middle point to the stay-bars, and pins applied to the stay-bars at points equidistant from the clamps for holding the bow-springs in proper position to receive the impact of the paddles, substantially as set forth.

6. In a power-wheel, the combination with hinged paddles, of a lock-bar for each paddle slidably mounted in guides and having its end extended, and means to be projected across the extended ends of the lock-bars for severally operating them to secure or release any of the paddles, substantially as set forth.

7. In a power-wheel, the combination with hinged paddles, of a longitudinally-movable lock-bar for each paddle, a spring for every lock-bar for holding it projected, means for depressing the lock-bars individually, and means for securing the lock-bars in a depressed position, substantially as described.

8. In a power-wheel, the combination with hinged paddles, of a longitudinally-movable lock-bar adapted to be projected within the path of a paddle, means for securing the lock-bar in a depressed position, and a spring for returning the lock-bar to a normal position when released, substantially as described.

9. In a power-wheel, the combination of hinged paddles, a longitudinally-movable lock-bar for holding a paddle out of working position and having a lateral extension near its outer end, and a spring exerting a lateral pressure against the lock-bar to force the said lateral extension into engagement with a portion of the wheel, whereby the lock-bar will be held depressed, substantially as set forth.

10. In a power-wheel, the combination of hinged paddles, stay-bars, lock-bars operating through the stay-bars and having lateral extensions, springs for projecting the lock-bars outward, and other springs exerting a lateral pressure against the lock-bars to force the lateral extensions thereof in engagement with the stay-bars, substantially as and for the purpose set forth.

11. In a power-wheel, the combination of hinged paddles, guides adjacent to the free ends of the paddles, stay-bars, lock-bars operating through the stay-bars and having their inner ends bent and operating in the said guides, and means for operating the lock-bars, substantially as and for the purpose set forth.

12. In a power-wheel, the combination with hinged paddles, and lock-bars longitudinally

movable, of a cross-bar, and a lever mounted upon the cross-bar and adapted to be projected within the path of the outer ends of the lock-bars, substantially as set forth.

5 13. In a power-wheel, the combination with hinged paddles, and lock-bars located in different vertical planes, of a cross-bar, and a lever slidingly mounted upon the cross-bar and adapted to be projected within the path
10 of the lock-bars, substantially as and for the purpose set forth.

14. In a power-wheel, the combination with hinged paddles, and longitudinally-movable lock-bars arranged in different vertical

planes, of a cross-bar, a lever slidingly mounted upon the cross-bar, a pin adapted to be engaged with the cross-bar, and a connection slidingly mounted upon the cross-bar and secured to the said pin, substantially as set forth.

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

SAMUEL CROCKER.

Witnesses:

FRANKLIN SPRINGER,
WHIT M. GROUT.