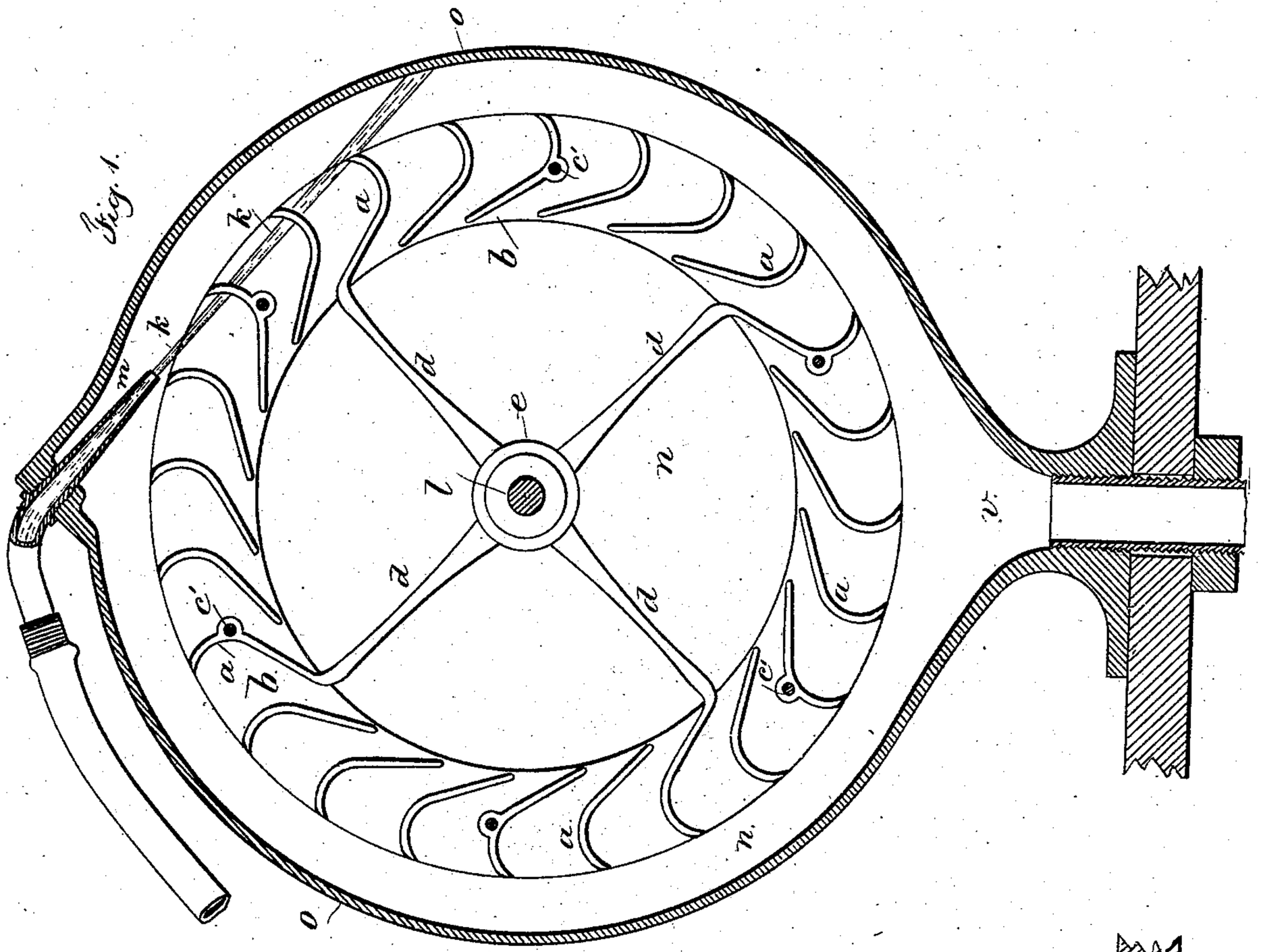
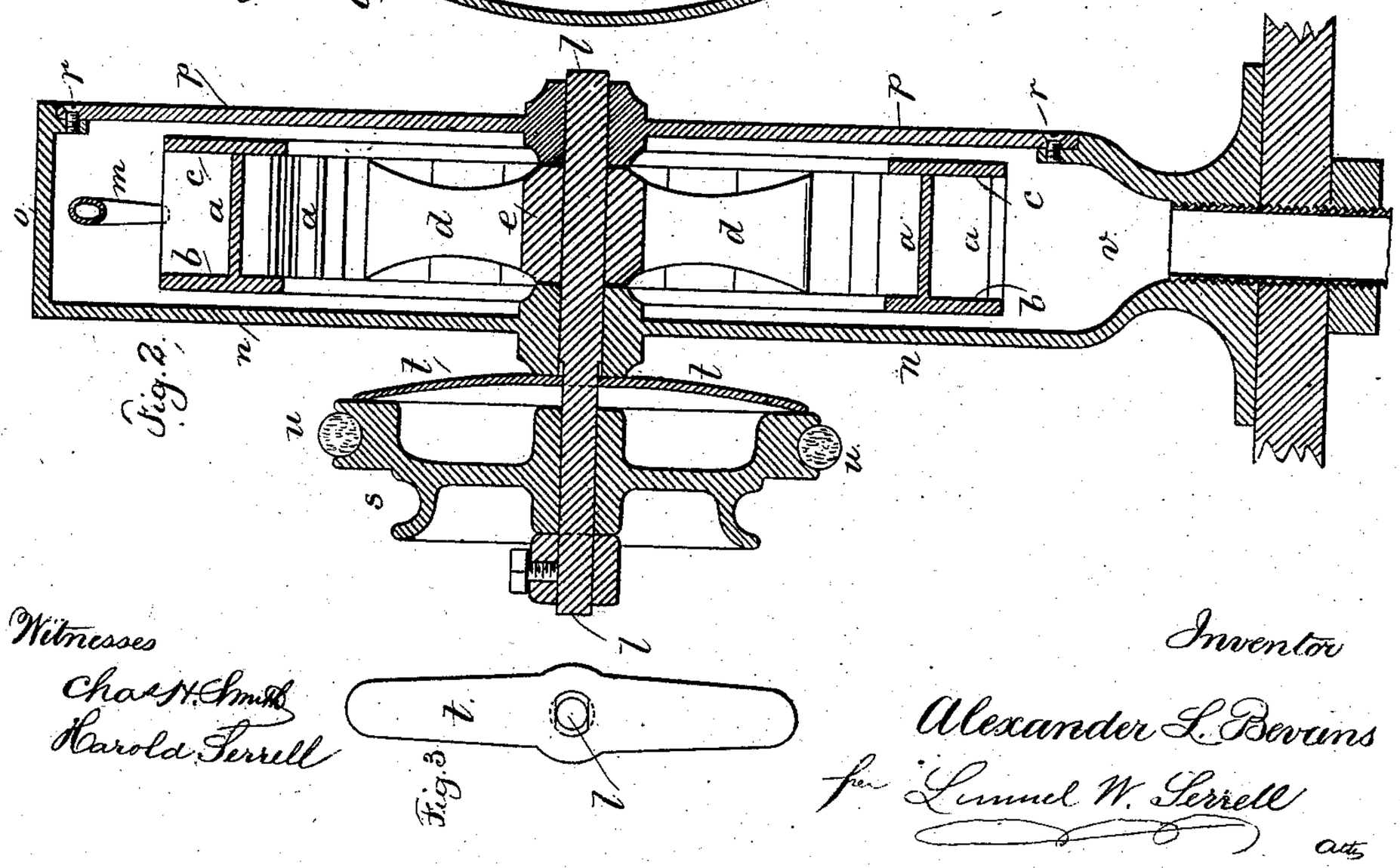
(No Model.)

A. L. BEVANS.

MOTOR FOR SEWING MACHINES, &c.

No. 289,958. Patented Dec. 11, 1883.





Witnesses
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UNITED STATES PATENT OFFICE.

ALEXANDER L. BEVANS, OF FLUSHING, NEW YORK.

MOTOR FOR SEWING-MACHINES, &c.

SPECIFICATION forming part of Letters Patent No. 289,958, dated December 11, 1883.

Application filed October 11, 1882. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER L. BEVANS, of Flushing, in the county of Queens and State of New York, have invented an Improvement in Motors for Sewing-Machines and other Machinery, of which the following is a specification.

In motors heretofore employed the force of the water has acted by pressure or gravity upon the wheel, which is a small water-wheel, and little or no use has been made of the velocity and impact of the water. In many places a sufficient head of water exists to cause a jet of water to issue with considerable velocity. I make use of a small jet of water issuing with the rapidity due to its hydrostatic pressure, and instead of using such water to fill buckets, or to drive the wheel by pressure or weight of water, I cause such jet of water to act upon the open curved fans of the wheel by the impact due to its momentum. I construct the fans of the wheel with reference to receiving the blow or impact from the issuing jet of water, and I proportion the jet and the wheel to the power required in such a manner that the fans of the wheel will revolve with the same or nearly the same speed as the issuing jet of water. This insures a continuation of the movement of the jet of water, and the fans of the wheel revolve in and with such jet in a manner similar to a pinion revolved by a rectilinear moving rack. By this arrangement I am able to obtain great speed and to reduce the same by a small pulley driving a larger one on the sewing-machine, so as to obtain the necessary power. The impact of the water on the fans of the wheels, being the result of momentum and weight, exerts the greatest force on the wheel, because where the momentum is stopped the water becomes inert and forms a clog on the wheel to prevent it rotating; hence with the water-motors heretofore in use the buckets, remaining full of water on one side, prevent the wheel turning faster than gravity will move the water, and the impact is substantially lost. With my wheel the buckets do not hold the water, and the surface of the wheel only has upon it a thin film of water, the water being thrown off by the centrifugal action and continuing on with the jet. In cases where only a few buckets have been employed upon arms for the water to act against, considerable loss of energy occurs from the jet not acting continuously on the wheel. It is well known that the force of a Gifford injector is lost if the column of water becomes divided and broken up; so in my improvement I maintain the solidity and density of the jet as much as possible, in order to obtain its maximum effect.

In the drawings, Figure 1 is a section at right angles to the axis of the wheel. Fig. 2 is a section in a plane passing through the axis, and Fig. 3 is an end view of the motor-shaft and spring.

The fans *a a* are, for convenience, contained between the two rings *b* and *c*, and it is preferable to cast the fans *a* upon the ring *b* in one piece with the arms *d* and hub *e*, and to bolt on the ring *c* by the bolts *c'*. Each fan is made as a portion of a cycloidal curve, so that its face is at right angles, or nearly so, to the jet of water *k*, and as the wheel rotates the fan will draw away from the jet of water, but still the surface will be nearly at right angles to the line of the jet. The shaft *l* is supported in suitable bearings. It is revolved by the said motor-wheel, and I remark that the jet of water is supplied by a pipe and suitable nozzle, *m*.

If desired, the motor might be used without any case, as it is desirable to allow the jet to continue its movement and to give rotation to the wheel, as before described; but, as inconvenience will usually arise from the splashing of the water, a suitable case is provided. This case has one side, *n*, and rim *o* cast in one, with a recess for the reception of the plate *p* on the other side. There are suitable bearings for the shaft *l* on the sides *n* and *p*, and the plate *p* is secured in place by the screws *r*. The joint is made water-tight by packing. This case is sufficiently large not to obstruct the free passage of the jet, and the water is delivered at the hopper-shaped bottom part *v* of the case to a sewer pipe or drain.

I prefer to place upon the shaft *l* the loose pulley *s*, and to apply to the same a spring-frictional driving-pressure. I have represented the elliptical spring *t* as fastened to and revolving with the shaft and its outer ends as pressing against the pulley *s*, so as to give motion to the same and to the sewing-machine

through the belt *u*. If the sewing-machine is stopped, the motor may be started, and the friction of the spring or the pulley will cause the latter to rotate and gradually start the sewing-machine.

By this improvement I am able to regulate the speed of the sewing-machine by a brake, or to stop the same entirely without stopping the motor, because the shaft of the motor will continue to revolve within the loose pulley, the frictional spring sliding on the pulley; hence the sewing-machine is rotated at a speed proportioned to the friction applied to its brake, and there is no loss of time in starting the machine, because the motor is constantly running.

I am aware that an open wheel with buckets has been employed with an internal acting jet, and that external jets have been used with buckets that are placed outside the rim of the wheel, and that a hollow or trough-shaped rim has been used with curved buckets within it. In my motor the wheel is open, being formed of two rings, with the curved fans between them, and the jet occupies a tangential position to the center of the fans, and the fans are curved, so as to be at right angles to the jet both as they enter and as they leave the straight jet of liquid.

I claim—

1. An open motor-wheel composed of the rings *b c*, with cycloidal curved fans *a* between them, in combination with a case surrounding the wheel, and having a free passage between it and the wheel for the water, and a jet-tube passing through the outer part of the case and being in the line of a tangent to the wheel, substantially as specified, whereby the wheel is caused to revolve at nearly the same speed as the issuing jet of water, as set forth.

2. The combination, in a motor, of a nozzle for an issuing jet of water, an open wheel with curved fans, a case surrounding the wheel-shaft *l*, a loose pulley, and a frictional connection to the shaft, substantially as set forth.

3. An open motor-wheel composed of the cycloidal curved fans *a* around the periphery of said wheel, in combination with a case surrounding the wheel, and having a free passage between it and the wheel for the water, and a jet-tube passing through the outer part of the case and being in the line of a tangent to the wheel, substantially as specified, whereby the wheel is caused to revolve at nearly the same speed as the issuing jet of water, as set forth.

4. In combination with an open wheel having cycloidal curved fans, a nozzle for an issuing jet of water, a shaft for the wheel, and a frictional connection, substantially as set forth, whereby the motor may be allowed to run at a nearly uniform speed, and the speed of the sewing-machine or other mechanism may be varied, substantially as set forth.

Signed by me this 9th day of October, A. D. 1882.

ALEXANDER L. BEVANS.

Witnesses:
GEO. T. PINCKNEY,
WILLIAM G. MOTT.