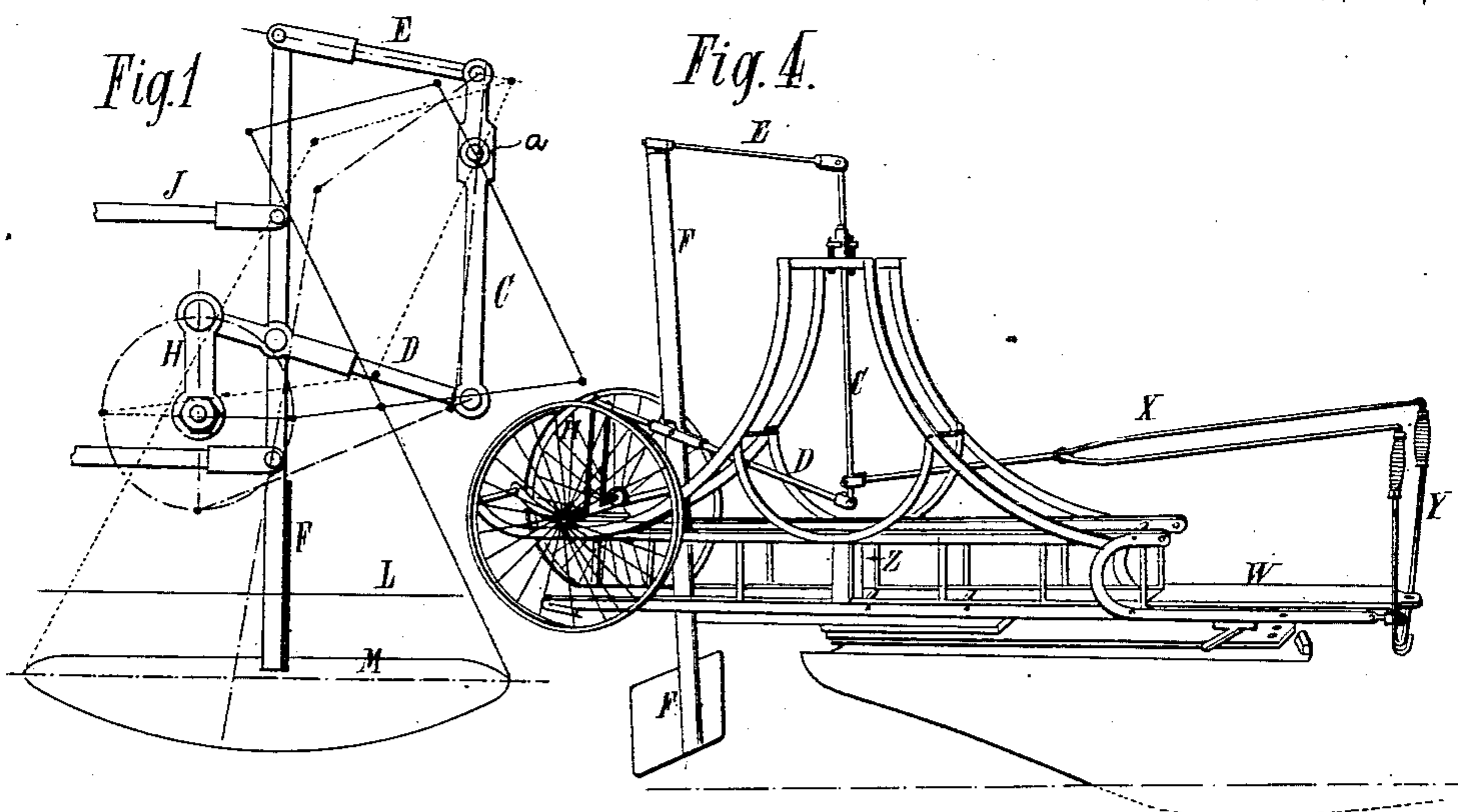
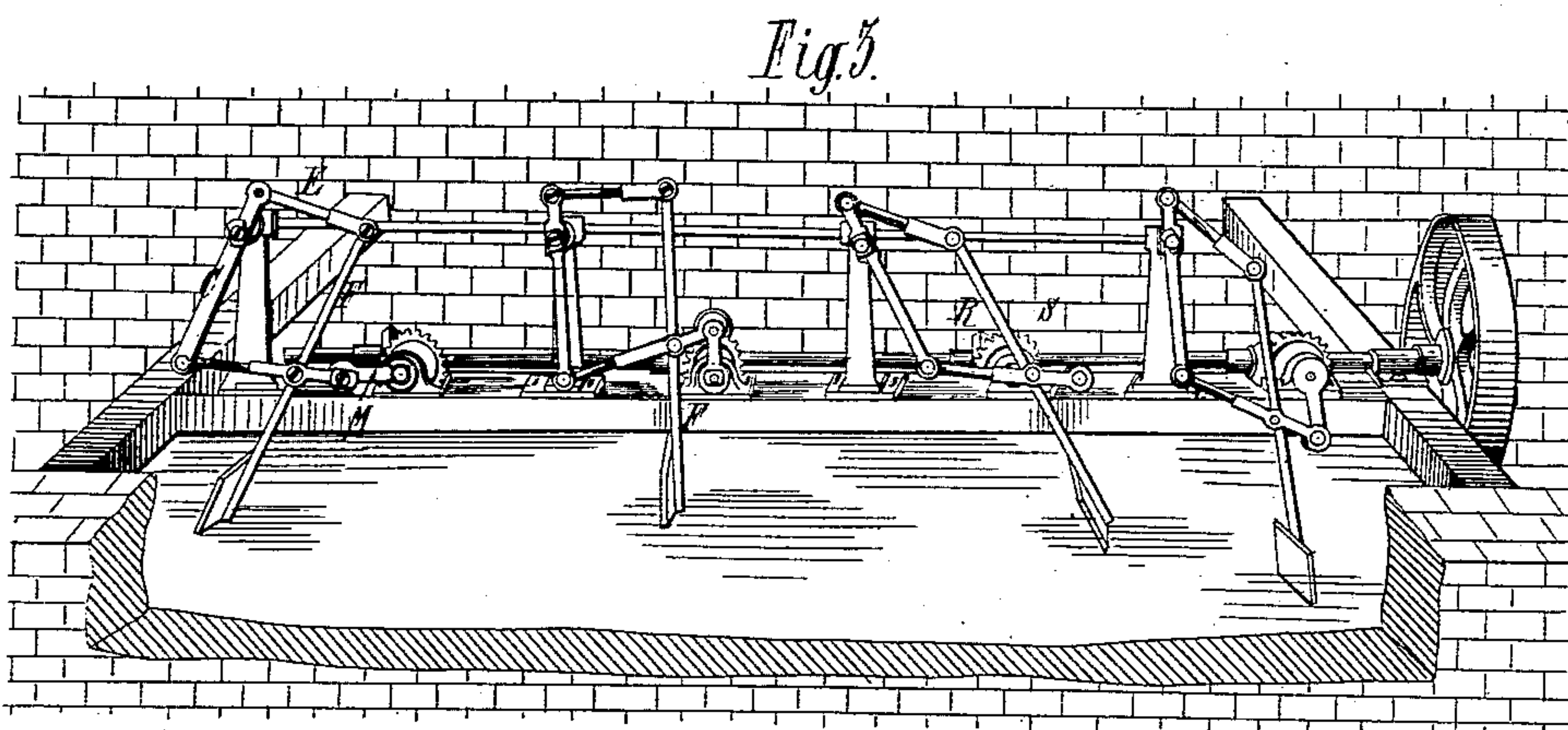
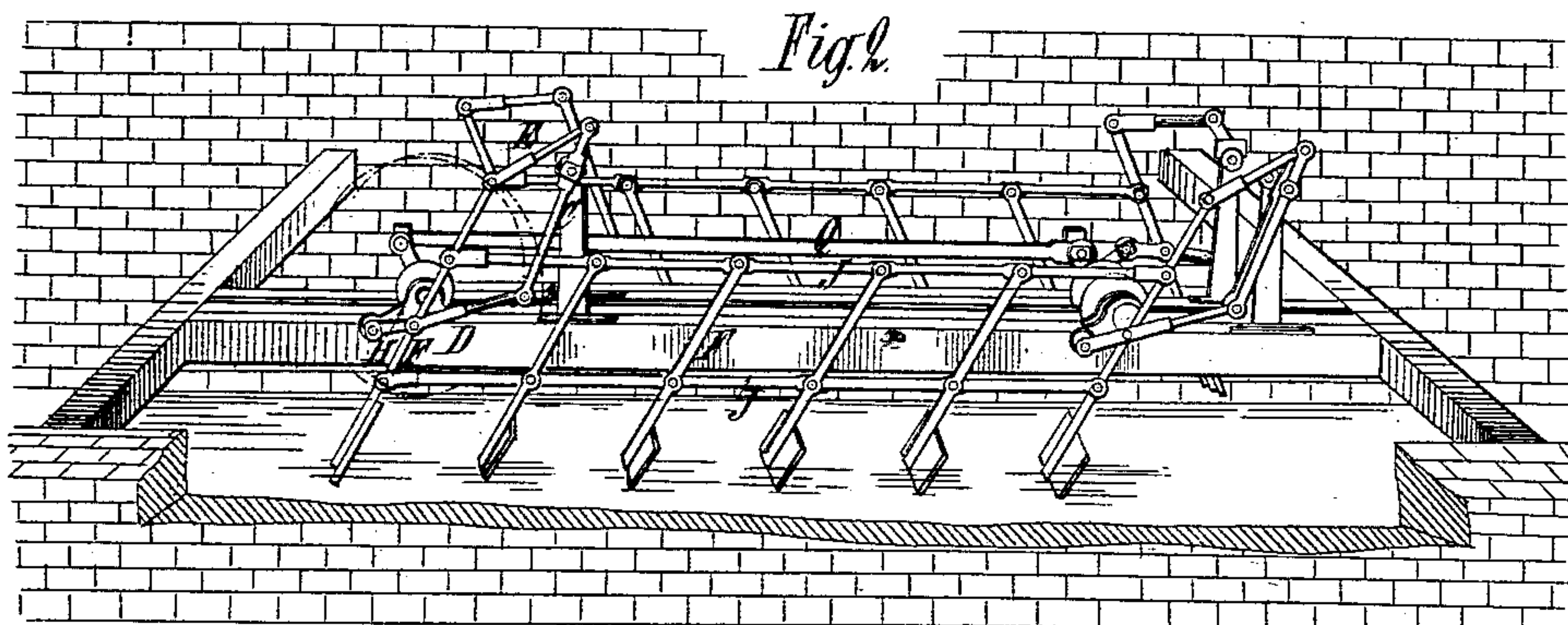


(No Model.)

E. POMBAS.
PADDLE HYDRO-MOTOR.

No. 411,167.

Patented Sept. 17, 1889.



Witnesses:

O. Lundgren
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Inventor:

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UNITED STATES PATENT OFFICE.

EUGENE POMBAS, OF RHEIMS, FRANCE.

PADDLE HYDRO-MOTOR.

SPECIFICATION forming part of Letters Patent No. 411,167, dated September 17, 1889.

Application filed December 7, 1887. Serial No. 257,245. (No model.) Patented in France May 22, 1887, No. 168,979.

To all whom it may concern:

Be it known that I, EUGENE POMBAS, a citizen of the Republic of France, residing at Rheims, in said Republic, have invented a new and useful Improvement in Paddle Hydro-Motors, (which has been patented in France May 22, 1887, No. 168,979,) of which the following is a specification.

This invention consists in a novel combination, hereinafter described and claimed, of paddles and means of transmitting motion thereto and of controlling the operation thereof applicable in a current of water as a motor or to vessels as a propeller.

Figure 1 in the accompanying drawings represents a side view of a paddle and its appurtenances, illustrating the principle of my invention. Fig. 2 is a perspective view showing the application of my motor with two sets of paddles placed side by side. Fig. 3 is a perspective view of one of my motors in which the paddles are arranged in front of and behind each other. Fig. 4 represents in perspective the application of my invention as a propeller to a boat.

Similar letters of reference indicate corresponding parts in all the figures.

The principle of my system illustrated in Fig. 1 is based upon the combination of four bars C D F E, pivoted together to form an articulated parallelogram, of which one C of the sides or bars forms a lever capable of oscillation about a fixed pivot *a*, another side or bar D being prolonged beyond its articulation to be connected with a crank H, keyed upon a shaft working in fixed bearings, the third side F, which is articulated to the said prolonged side or bar D, being also prolonged beyond its point of articulation and having a paddle attached to its so-prolonged part. If it be supposed that the crank H had imparted to it a rotary motion, it would involve in its movement the bar D, and consequently the whole system, the movement of which may be easily traced by examining the four positions which are indicated in lines of different quality in Fig. 1 and which correspond, respectively, with the position of the crank H at different quarters of its revolution. During a complete revolution of the crank the extremity of the paddle F describes a trajectory O. Now,

if we suppose a current of water directed toward the right or left, and of which the level M passes by the two extreme points of the curve O, it is evident that a portion or the whole of the paddle will be carried below the said level, and as much of it as is submerged will be moved by the current and actuate the parallelogrammic system, and consequently produce the rotary motion of the crank H. The motive effect of the blade will only take place while its extremity will be in that part of the curve O situated below the level M. It therefore results that to obtain a continuous movement it becomes necessary to couple several paddles in such manner that when one of them leaves the water another enters it. These paddles may be arranged side by side or one before another.

In Fig. 2 I have represented the combination of two rows of paddles connected with two cranks situated at ninety degrees to each other upon each of two shafts arranged, respectively, at each extremity of the system, and connected together by a coupling-rod Q. Between the two paddles, at the end of each row, mounted as shown in Fig. 1, are arranged intermediate paddles connected with the former by rods J J in such manner that they all participate in exactly the same movement.

In the example above described a fly-wheel is necessary to pass the dead-points which occur at the moment when paddles of one row leave the water and when the paddles of the other row enter it. To obviate the necessity of employing a fly-wheel, instead of two rows of paddles four rows may be employed, connected, respectively, with four cranks set at ninety degrees to each other on each of the two shafts at the ends of the system in such manner that one of the rows of paddles will always be in operation. The same result may be arrived at by arranging the paddles in file, or one before another, as shown in Fig. 3. These paddles are connected together by means of a system of bevel-gears R S, gearing the shafts of their respective cranks H with a line-shaft extending through the whole length of the system. The cranks of the several paddles are keyed upon their respective shafts in such manner that they are at ninety degrees to each

other, so that one of the paddles is always completely plunged into the water. Instead of having four paddles, as in Fig. 3, I may by occupying a sufficient length of the current couple eight, twelve, sixteen, &c., and, generally speaking a multiple of four operating in the same manner.

Fig. 4 shows an example of the application of my apparatus as a propeller for navigation. In this case the blade F is placed in rear of the boat and is connected by means of an articulated parallelogram C D E F with a crank H. In this case, however, instead of the paddle being moved by a current of water, it is moved by a steam-engine or other motor, or by a man on board the boat. In the latter case the rower is placed upon the seat W, and by the aid of handles Y and connections X with the lever C of the parallelogram he puts the paddle in motion.

This propelling-paddle may at the same time serve as a rudder. For this purpose its mechanism is to be fitted into a frame-work attached to the boat and capable of turning about a vertical shaft Z, Fig. 4, connected with the boat in any suitable manner. By placing the paddle more or less obliquely relative to the axis or longitudinal center of the boat the latter may be turned in the same way as by a rudder. In the case of very large boats two steam propelling-paddles may be arranged side by side, and in order to turn the vessel within a short distance, or nearly on its own center, it will be sufficient to reverse the movement of one of the two paddles in such manner as to make it propel backward, while the other continues to propel forward.

This propelling apparatus may be placed

behind the boat or on each side at the middle of its length, or it may be placed in the center of the boat with an arrangement analogous to that represented in Fig. 3. By the prolongation of two of the bars of the parallelogram, which are directly articulated together, as D and F, each beyond the point of articulation, which is common to both, and applying the paddle to the so-prolonged part of one and connecting the so-prolonged part of the other with the crank, the crank and the paddle are brought near together and the power is applied in a more nearly direct and a more advantageous manner, and when the device is used as a propeller the crank-shaft of the engine is brought down very near the propeller.

What I claim as my invention, and desire to secure by Letters Patent, is—

In a hydro-motor, the combination, with a lever C, having a fixed fulcrum *a*, the bar E, articulated to the short arm of the lever C above said fulcrum, the bar D, articulated to the long arm of the lever C below said fulcrum, the bar F, articulated to the bars E D, said bar F extending downwardly below the bar D, and the bar D extending across the bar F and beyond the same, a crank to which the bar D is connected beyond the bar F, and a paddle upon the portion of the bar F below the bar D, substantially as specified.

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

EUGENE POMBAS.

Witnesses:

A. MINTREL,
A. BOSSENSEY.