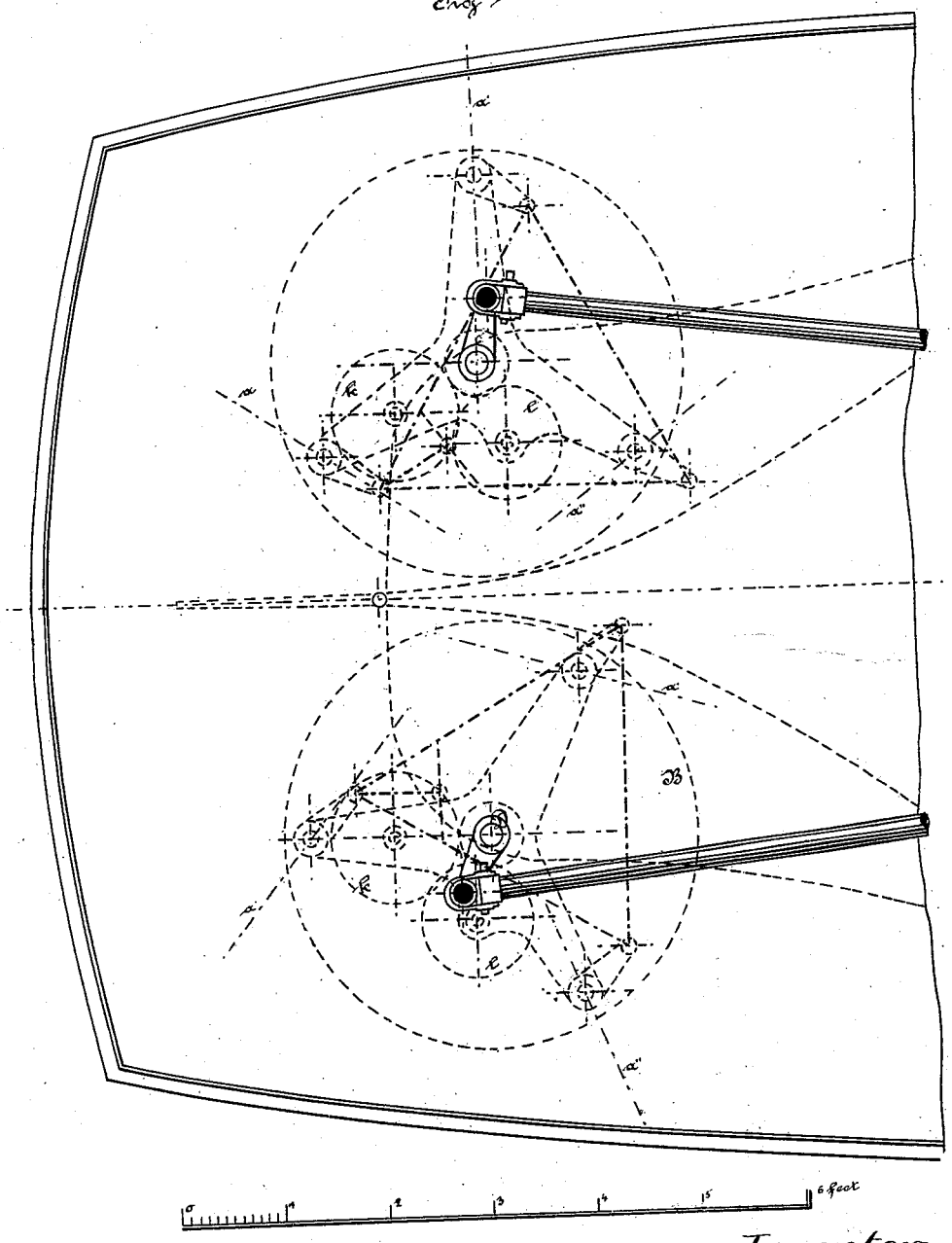
3 Sheets—Sheet 1.

C. KREBS.

Steering Paddle-Wheels.

No. 209,901. Patented Nov. 12, 1878.

Fig. 1



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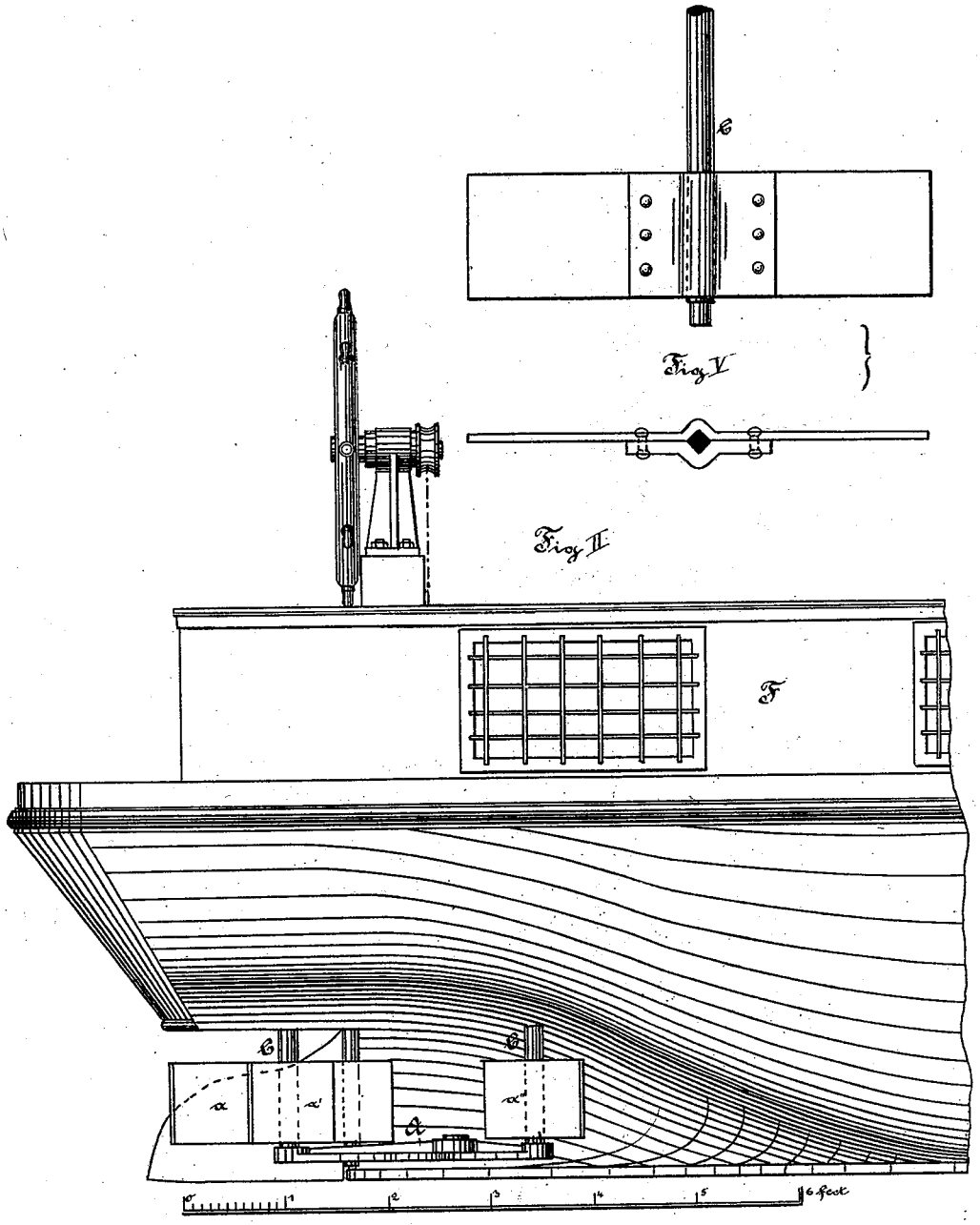
3 Sheets—Sheet 2.

C. KREBS.

Steering Paddle-Wheels.

No. 209,901. **Patented Nov. 12, 1878.**



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C. KREBS.
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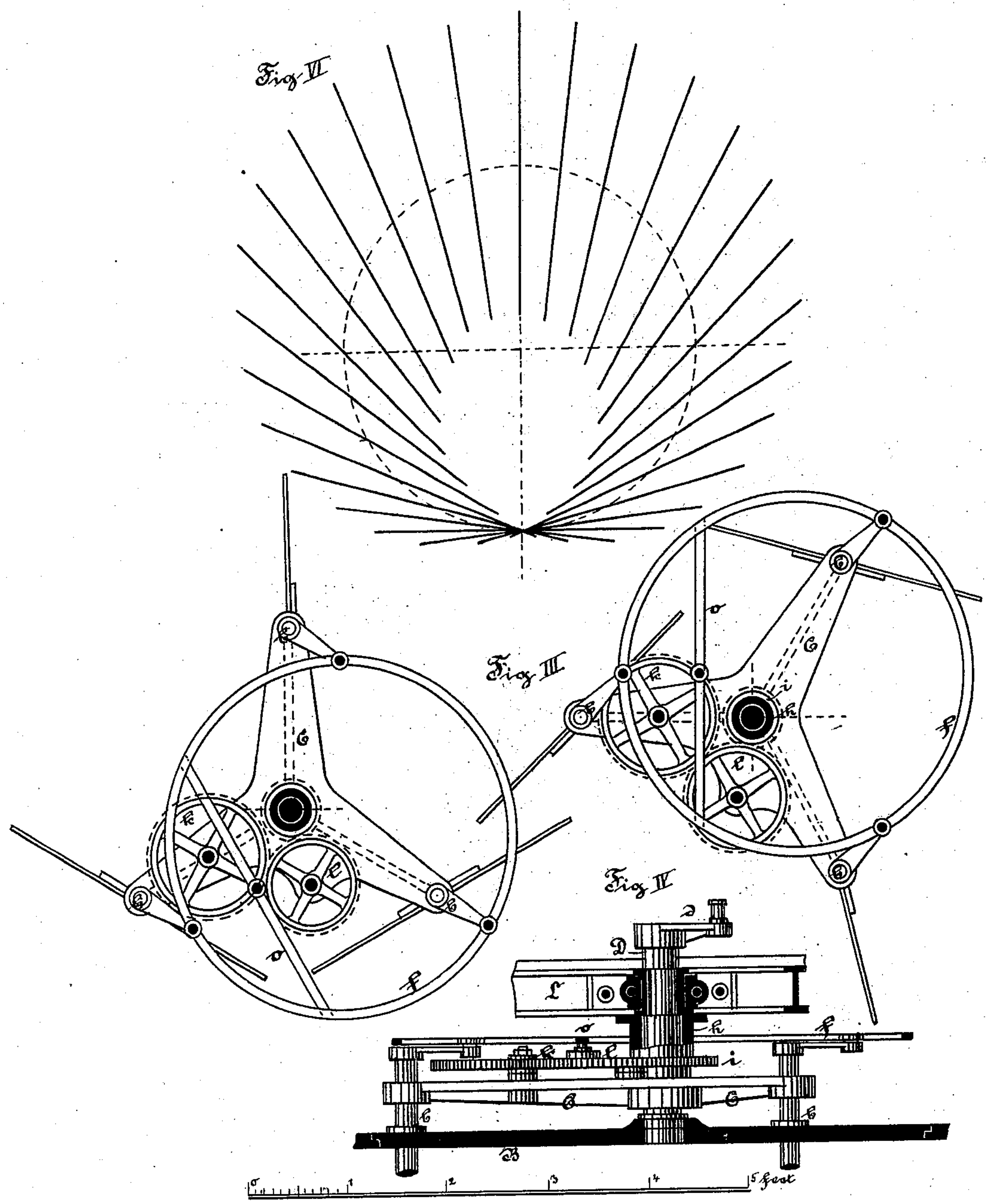

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UNITED STATES PATENT OFFICE.

CARL KREBS, OF VOGELSDORF, NEAR BERLIN, PRUSSIA.

IMPROVEMENT IN STEERING PADDLE-WHEELS.

Specification forming part of Letters Patent No. **209,901,** dated November 12, 1878; application filed April 1, 1878.

To all whom it may concern:

Be it known that I, CARL KREBS, of Vogelsdorf, near the city of Berlin, Prussia, have invented a new Motor for Paddle-Wheels, Wind-Wheels, Ventilators, &c., of which the following is a specification:

The invention relates to that class of paddle-wheels which are arranged at the stern of a boat and mounted upon vertical axes, so as to be used for propelling and steering purposes.

The invention consists in the construction and combination of parts, which will be hereinafter fully explained, and specifically set forth in the claims.

In the accompanying drawing, forming part of this specification, Figure 1 is a plan of the hull of a boat, showing the position of two paddle-wheels constructed according to my invention. Fig. 2 is a side elevation of a boat, representing more fully the construction and arrangement of the paddle-wheels. Fig. 3 illustrates the mechanism for feathering the paddles of the two wheels. Fig. 4 is a vertical section of one of said wheels on an enlarged scale. Fig. 5 represents the manner of fastening the paddles to their shafts. Fig. 6 is a diagram, showing the different positions which the paddles assume in the course of their rotations.

For the propulsion of marine vessels I use two paddle-wheels, which are arranged within the hull of the boat, and mounted on vertical shafts or axes, so as to dispense with paddle-boxes, and render the boat better adapted for shallow waters. Each wheel is provided with three paddles, *a* a^1 a^2, which are fastened to three corresponding shafts, *b*, by means of a clamp and screws, or, in other words, in the manner fully shown in Fig. 5 of the drawing. The paddle-shafts are journaled at their lower ends in a casting, A, which turns on a step or bearing applied to the outside hull of the vessel, and said shafts extend through a circular plate, B, into the hull of the vessel, where they are journaled in a second casting, C. The latter is keyed to the vertical crank-shaft D, which is rotated by means of a horizontal steam-engine or other motor located in the engine-room F of the vessel. The paddle-shafts are rotated by means of crank-arms *d*, which are applied to the upper ends of said shafts, and turn in an opposite direction from the main crank-shaft D, and with half the velocity of the latter. In order to effect these results, the crank-shaft D is provided with a fixed encircling sleeve or collar, *h*, having a spur-gear, *i*, into which meshes an intermediate pinion, *l*, giving motion to the spur-wheel *k*. The pinion *l* and spur-wheel *k* are both journaled in the revolving casting or ring C, and are made double the size of the fixed spur-wheel on the sleeve *h*. The spur-gear *k* is connected with a ring, *f*, by means of a stud, *o*, and this ring is, in turn, connected with the crank-arms of the paddle-shafts by means of gudgeons on the outer ends of said crank-arms.

It will be perceived from the above description that the paddle-wheels are always entirely submerged in the water, and that paddles will be presented at right angles to the water in making the effective stroke, and that the paddles not in action will present their edges to the water.

Both paddle-wheels are supported by independent frames F, and are operated by independent engines, so that they can be operated separately for steering purposes.

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

1. The combination of the lower casting, A, top casting, C, and intermediate bearing-plate, B, vertical paddle-shafts *b*, and paddles *a* a^1 a^2, with mechanism for rotating the paddle-frame and feathering the paddles, and the hull of the boat, provided with an opening and seat for the bearing-plate, so as to produce a water-tight joint between the same, as herein set forth.

2. The combination of the outer ring, *f*, the loose collar or sleeve *h*, having spur-disk *i*, the large spur-wheel *k*, and intermediate pinion, *e*, connected with the ring *f*, with the paddle-shaft D, the paddles and the vertical paddle-shafts having cranked upper ends, as and for the purpose set forth.

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

CARL KREBS.

Witnesses:

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EDWARD P. MACLEAN.