

(No Model.)

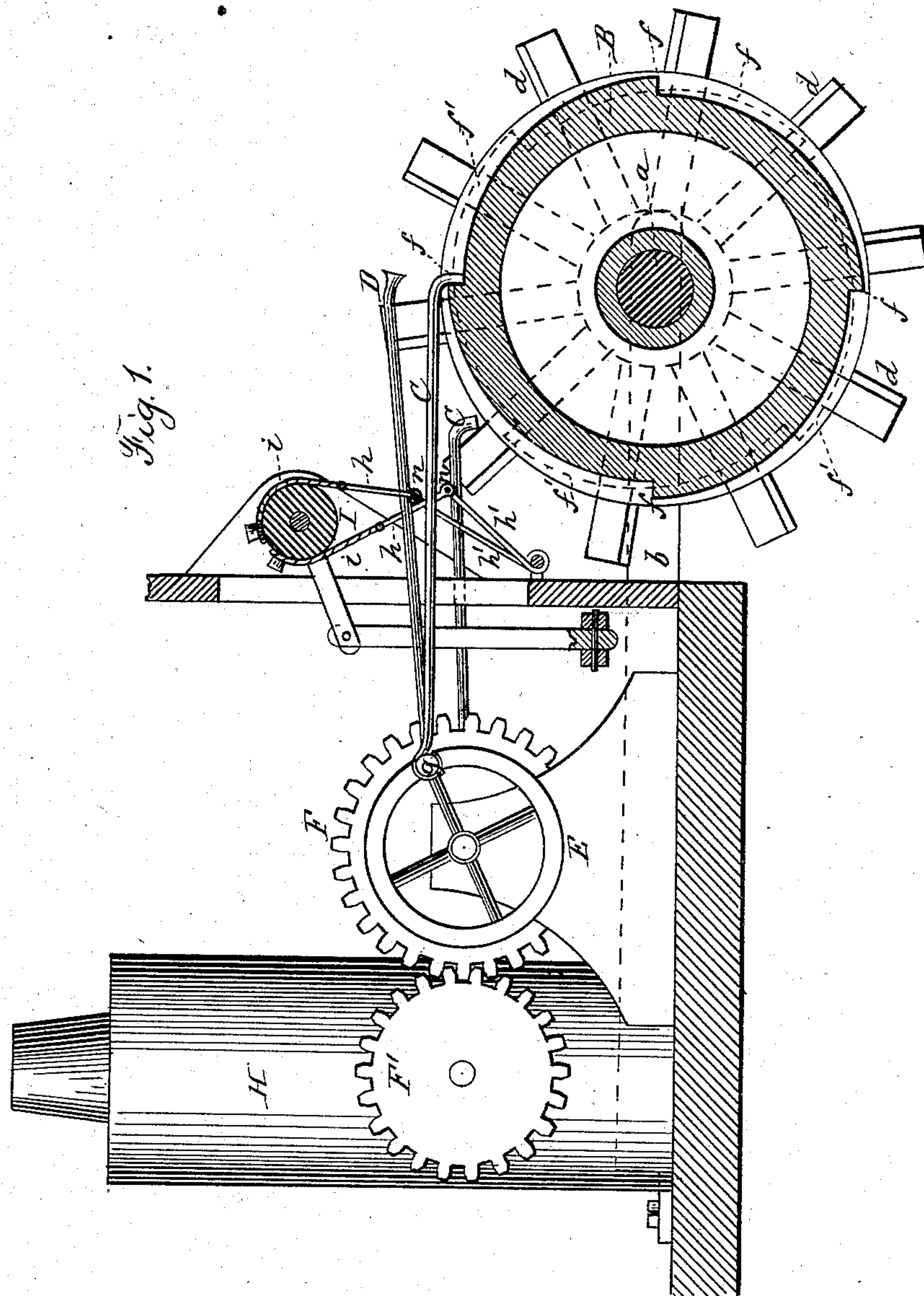
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E. L. WILLIAMS.

PADDLE WHEEL.

No. 278,477.

Patented May 29, 1883.



Witnesses:
Edmund Brodhag
Jos. C. Wilgman

Inventor:
pro Elijah L. Williams
Johnson & Johnson
Attys.

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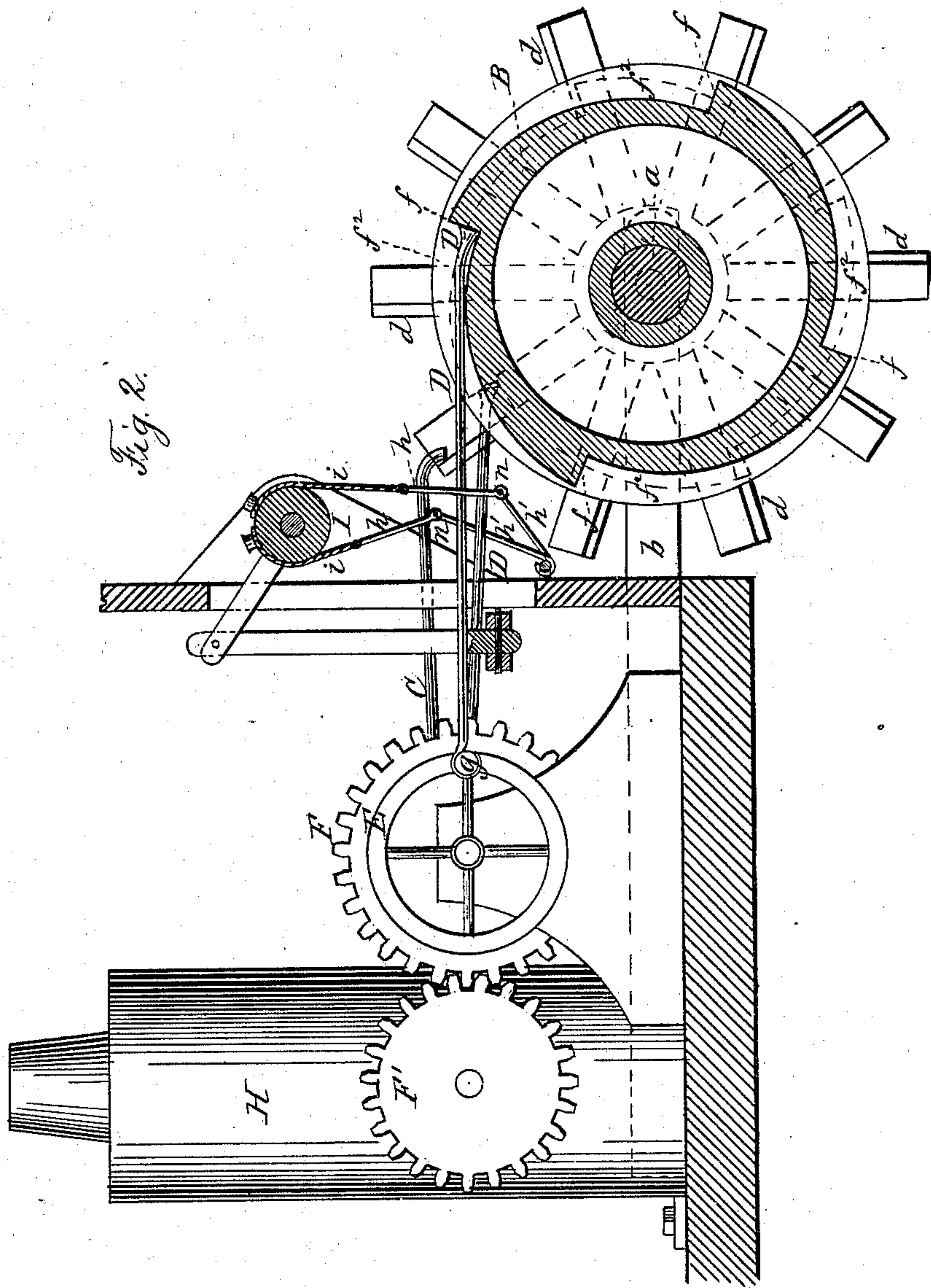
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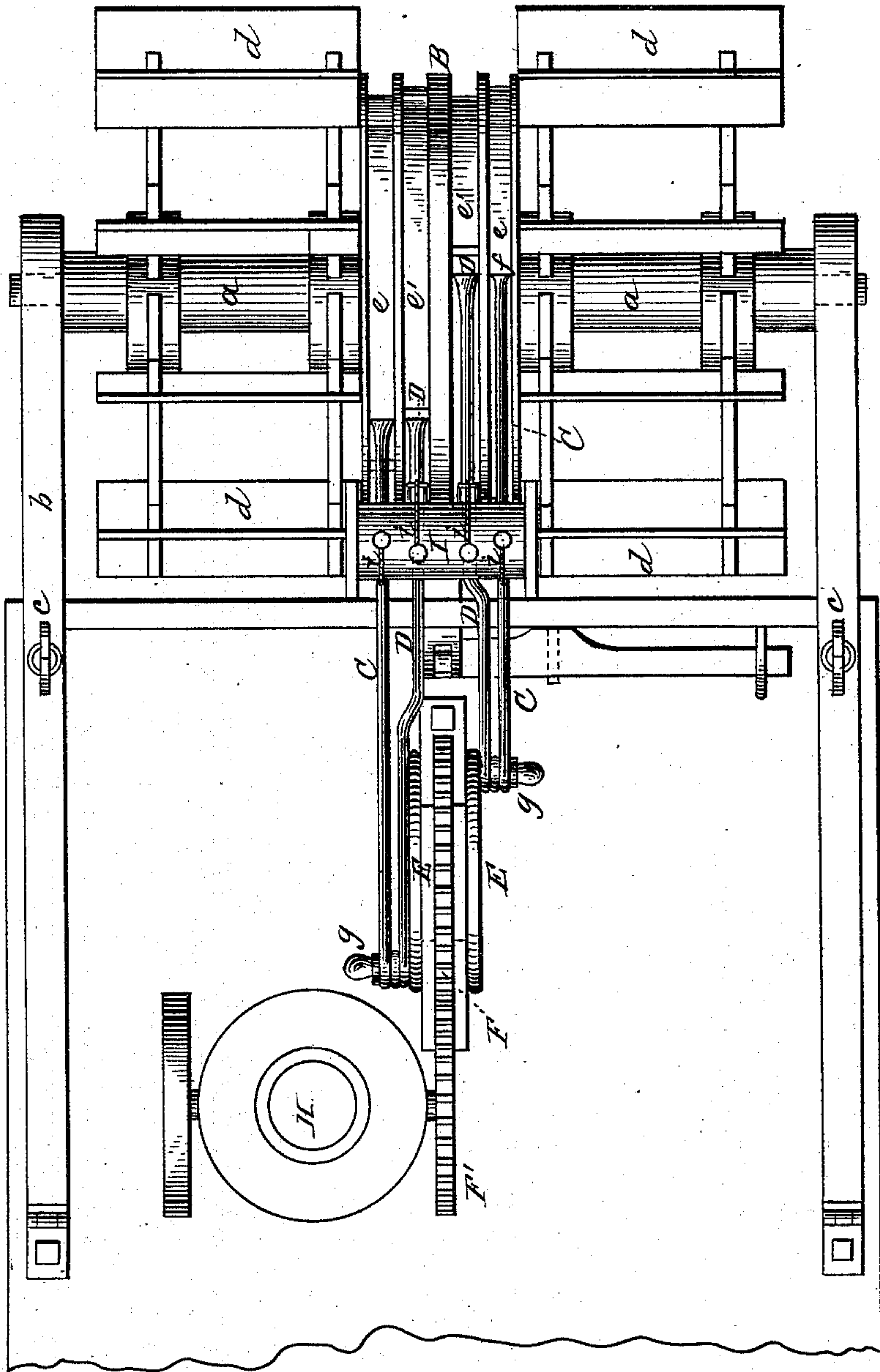
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Fig. 3.



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UNITED STATES PATENT OFFICE.

ELIJAH L. WILLIAMS, OF MARIANNA, FLORIDA.

PADDLE-WHEEL.

SPECIFICATION forming part of Letters Patent No. 278,477, dated May 29, 1883.

Application filed November 29, 1882. (No model.)

To all whom it may concern:

Be it known that I, ELIJAH L. WILLIAMS, a citizen of the United States, residing at Marianna, in the county of Jackson and State of Florida, have invented certain new and useful Improvements in Propellers, of which the following is a specification.

My invention relates to improvements in propelling boats—such as scows and flat-boats using stern paddle-wheels on shallow water—in which the paddle-wheel is revolved by the reciprocating action of pawls and ratchet-wheels.

The particular improvements which I have made consist of a paddle-wheel divided by a central cylindrical body having a diameter about equal to the distance between the inner edges of two diametrically-arranged paddles, and divided into four circumferential toothed grooved ways, in combination with two ratchet-pawls adapted to operate within two of said toothed grooved ways, and two pushing-arms adapted to operate within the other two of said toothed grooved ways, and means for controlling the operation of said pawls and arms to reverse the motion of the propeller. The pulling-pawls and pushing-arms are connected in pairs to pins arranged upon the opposite faces of a balance-wheel operating like a double crank and driven from a gear-wheel on the shaft of an engine. The construction is comparatively cheap, and the arrangement and operation of the propelling devices allow the propeller to be adjusted up or down to suit the load of the boat, which is important on shallow rivers.

Referring to the accompanying drawings, Figure 1 represents a vertical section of a stern paddle-wheel propeller, the operating-pawls being shown in action to carry the boat forward; Fig. 2, a similar section, showing operating-arms, being shown in action to carry the boat backward; and Fig. 3, a top view of the propeller and its operating devices.

The paddle-wheel is arranged at the stern of the boat, a portion of the main deck of which may be indicated by the letter A. The shaft *a* of the propeller is mounted in timbers *b b*, projecting rearward beyond the stern from each side of the boat. These propeller-carrying timbers are hinged at their rear ends to the boat a suitable distance back of the stern, and these timbers are secured at or near the stern by ver-

tical adjusting screw-bolts *c c*, or any other suitable means by which the propeller can be raised and lowered, according as the boat may be more or less loaded. The propeller has the usual armed paddle-wheel blades, *d d*, is of a length about equal to the width of the boat, and is divided in the middle of its length by a solid cylindrical body or rim, B, wide enough to be formed with four circumferential toothed grooved ways, *e e'*, side by side. The teeth *f* of two of these grooved ways, preferably the outside ones, *e*, are formed by eccentric grooves *f'*, so as to receive the pulling action of alternately-reciprocating pawls C C to revolve the paddle-wheel for propelling the boat forward. The teeth *f* of the other two grooved ways *e'* are, in fact, abutments, and are formed by eccentric grooves *f''*, so as to receive the pushing action of alternately-reciprocating arms D D to revolve the paddle-wheel for propelling the boat backward. The distance between the teeth and abutments is a little less than the stroke of the pawls and arms to insure their action at every stroke. The teeth and the abutments are faced with iron or other suitable material, and the operating pawls and arms are of iron, and of sufficient weight to retain their operative relation to their respective grooves when in use. The pulling-pawls and the pushing-arms operate through suitable guides or slots in the stern of the boat, by which they are kept in line with the toothed grooved ways of the paddle-wheel. They are connected with crank-pins *g g*, arranged upon the opposite sides of balance-wheels E, so that the pawls or the arms, whichever may be in use, are operated alternately. These balance-wheels are suitably mounted upon the deck, and are driven by a gear-wheel, F, meshing with a gear, F', on the shaft of an engine, preferably of an upright-boiler form, also placed upon the deck, and which H may represent.

As the pulling-pawls and the pushing-arms cannot operate at the same time, I provide means for raising the pawls out of action of the propeller-teeth, and at the same time lower the pushing-arms into action. This control of the operating devices is effected by connecting the pawls and the arms to a drum, I, secured to the stern of the boat, so that when said drum is turned to raise the pawls it will by the same

turning lower the pushing-arms. Each pawl and arm is connected to this drum by a link, *h*, and cord *i*, the latter winding to raise the pawls and unwinding to lower the arms. These links are preferably formed of two sections, *h* and *h'*, the lower one, *h'*, being connected to the stern of the boat and extending out, so as to form a rest or support, *n*, at its link-connecting end for the pawl or arm to raise and carry the acting ends of the pawls clear of the toothed grooved ways in their forward stroke, and let them down into the toothed grooved ways at the end of such stroke, so as to catch into the teeth and act on their rearward movement. The acting ends of the pushing-arms are by their links also raised and carried clear of the grooved ways of the propeller on their rearward stroke and lowered into action at the end of such stroke, so as to push on their forward stroke. By this construction for the operating devices the propeller is relieved of the friction of the pawls and arms on their non-operating strokes.

I claim—

1. The combination, with the paddle-wheels and the circumferentially-toothed grooved ways

arranged between the said wheels, of the alternately-operating pulling ratchet-pawls *C C* and the alternately-operating pushing-arms *D D*, with means, substantially such as described, whereby the operation of said pawls and arms are controlled to reverse the motion of the propeller.

2. In a propeller for flat-boats, the combination, with the paddle-wheels and the circumferentially-toothed grooved ways arranged between them, of the alternately-operating pulling ratchet-pawls *C C*, the alternately-operating pushing-arms *D D*, the pivoted link-rests *h h'*, the drum *I*, and means, substantially such as described, whereby said drum and its connected link-rests are operated to raise said pawls out of action and to lower said arms into action, for the purpose specified.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

ELIJAH L. WILLIAMS.

Witnesses:

A. E. H. JOHNSON,
J. W. HAMILTON JOHNSON.