

(No Model.)

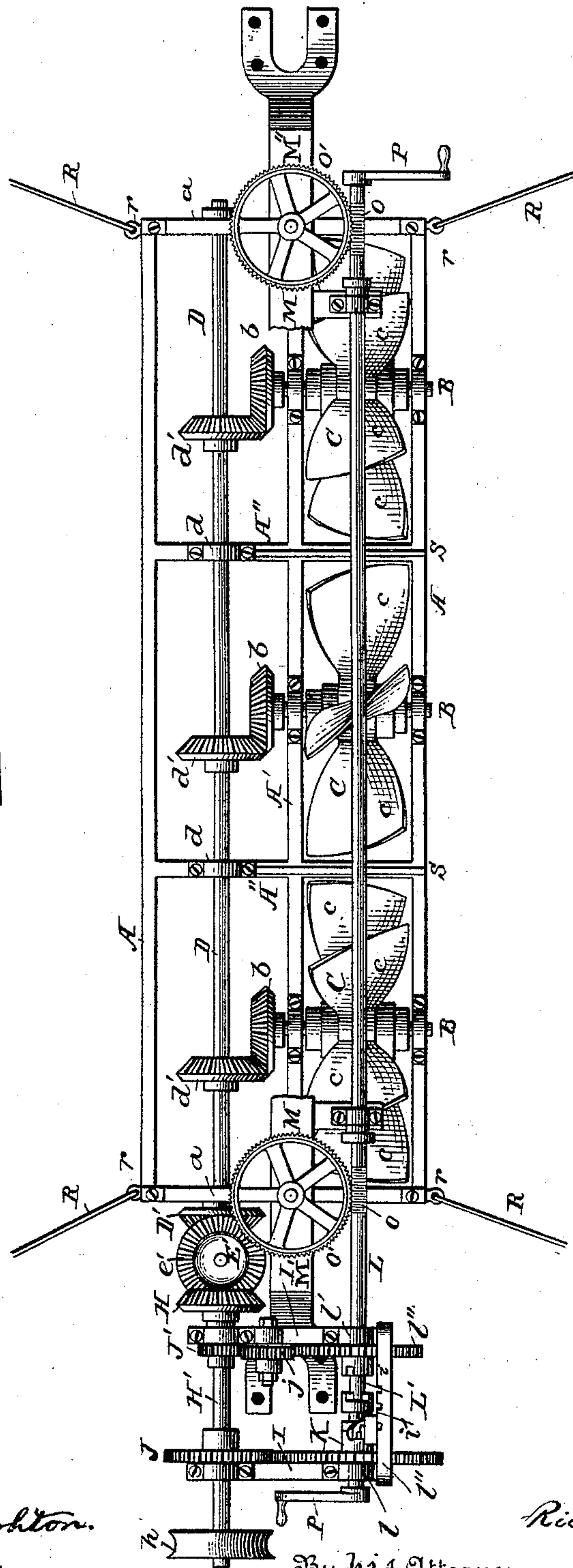
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R. E. GRAY.  
CURRENT WATER WHEEL.

No. 417,021.

Patented Dec. 10, 1889.

Fig. 1.



Witnesses  
*Thos. Houghton.*  
*M. H. Singleton.*

Inventor  
*Richard E. Gray*  
By his Attorney *Wm. R. Singleton*

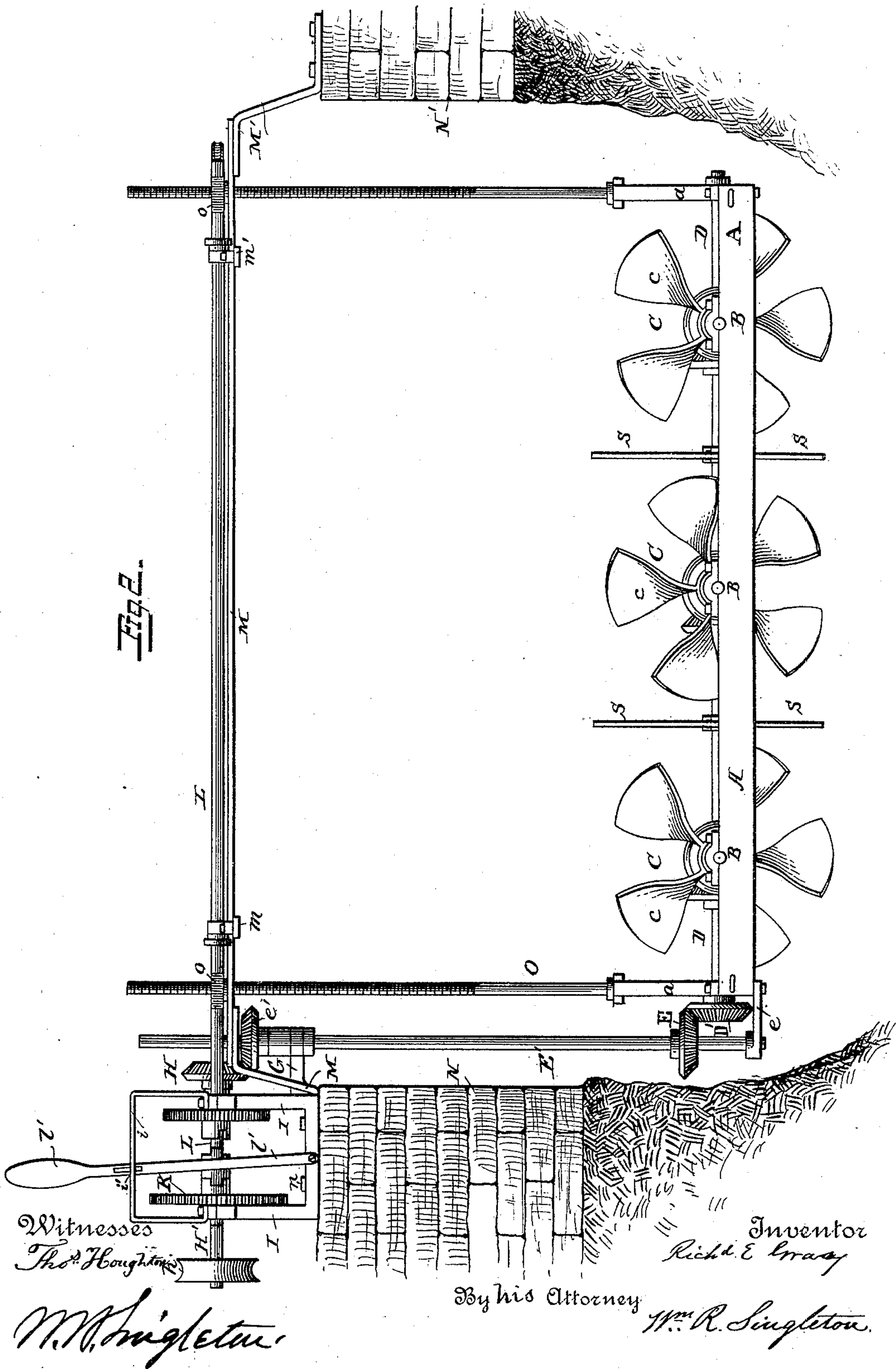
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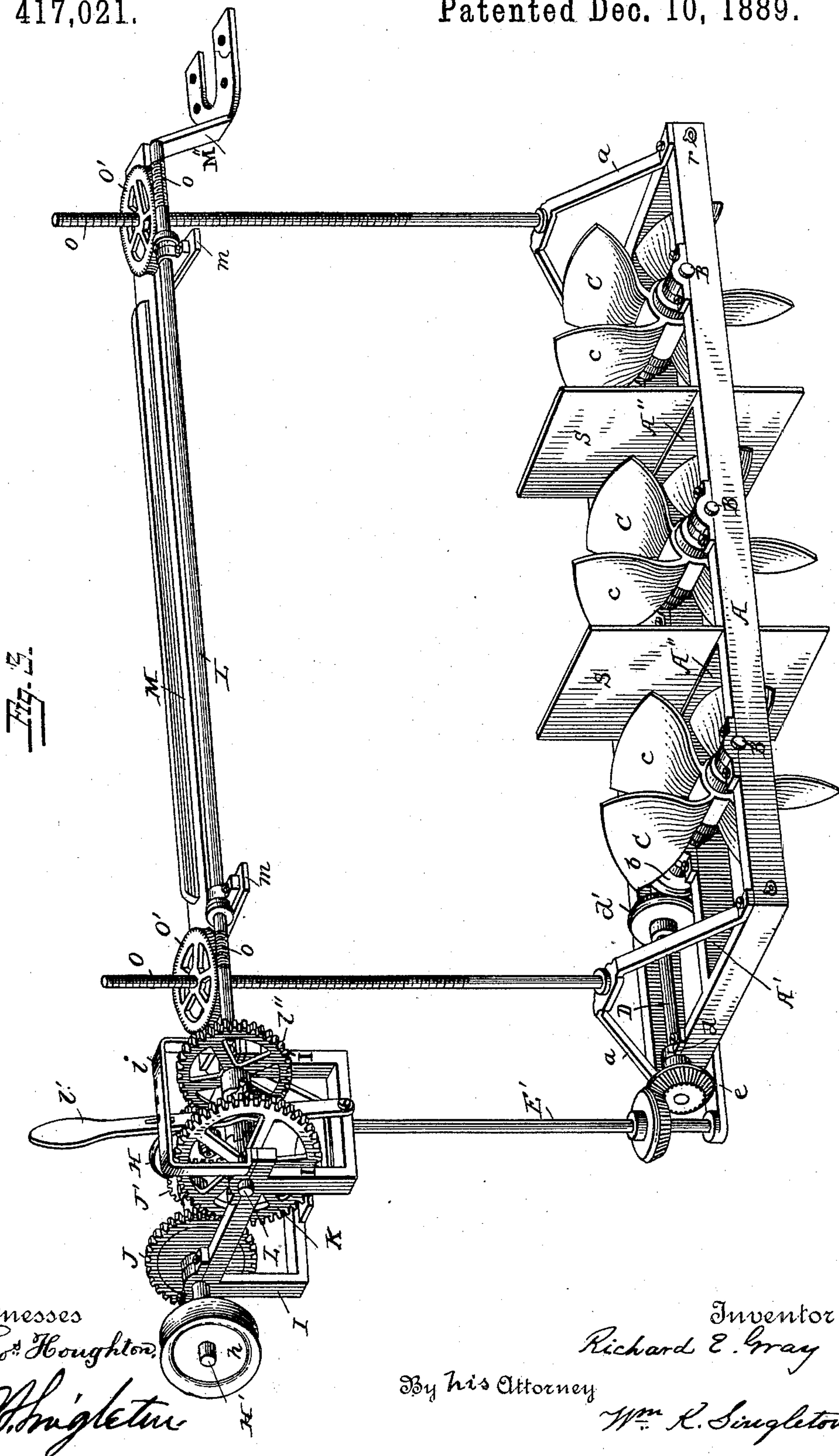
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# UNITED STATES PATENT OFFICE.

RICHARD E. GRAY, OF MUNCY, PENNSYLVANIA.

## CURRENT WATER-WHEEL.

SPECIFICATION forming part of Letters Patent No. 417,021, dated December 10, 1889.

Application filed September 26, 1889. Serial No. 325,147. (No model.)

*To all whom it may concern:*

Be it known that I, RICHARD E. GRAY, a citizen of the United States, residing at Muncy, in the county of Lycoming and State of Pennsylvania, have invented certain new and useful Improvements in Current Water-Wheels; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to certain improvements in current water-wheels, which will be hereinafter more particularly described and pointed out.

In the accompanying drawings, forming part of this specification, Figure 1 is a plan view of the apparatus. Fig. 2 is a side elevation. Fig. 3 is a perspective view.

A is a frame, made of cast metal, having a longitudinal bar A' about midway of its width.

A'' A'' are cross-bars between the water-wheels.

B B B are short shafts supported in proper journal-boxes on one of the side frames of A and the longitudinal bar A'. On these shafts B are secured the water-wheels C C C, having spiral blades c c c, &c., placed at such angles as may be found most suitable for the current in which the machine is to be operated. On the inner ends of the shafts B are beveled gear-wheels b b b.

A shaft D is supported in suitable journal-boxes d, &c., on the cross-bars A'' and the end bars of frame A. On this shaft D are beveled wheels d', &c., which mesh with the beveled wheels b, &c. On one end of shaft D, outside of the frame A, is a beveled wheel D', which gears with a beveled wheel E on a vertical shaft E'. The lower end of shaft E' is stepped in a projection e on the lower side of the end of frame A. This shaft E' extends upwardly, and the upper end is supported in a suitable bearing in a bracket G. On the upper end of shaft E' is a beveled wheel e', which is adjustably secured on the shaft E' and is fastened by a set-screw. (Not shown.) The wheel e' gears with a beveled wheel H on the end of a short horizontal shaft H', which is suitably supported on a metal frame I, which frame can be secured to any

proper structure N by bolts n, to be well anchored in a foundation of masonry or timber, according to the situation of the stream and surroundings. On the shaft H' there is a large spur-wheel J and a small spur-wheel J'. The spur-wheel J gears with a wheel K on a horizontal shaft L, extending the whole length of the apparatus, and is supported in suitable journal-boxes l l' in the frame I and on two arms m m', projecting from a bar M, which bar is supported at each end upon brackets M' M'', secured to the foundations N N by suitable bolts anchored therein. On this shaft L, between the bearings l l', is a double clutch L', to be operated by the handle l'', which can be secured in either of the three notches i' in the yoke i. (Shown in Fig. 1.) The purpose of this clutch will be hereinafter explained.

At each end of the frame A there is a standard a, to which is secured a vertical screw-threaded rod O. Immediately above the bar M on each screw-rod O is fitted a worm-wheel O', which works upon an endless thread o on the horizontal rod L. Whenever the rod L is rotated, the wheels O' are carried around, and by means of the interior threads in the hubs of the wheels the screw-rods O O are raised or lowered, and the frame A is thereby adjusted to the proper position in the current. To accomplish this raising and lowering the clutch L' is used.

On the shaft H' is a small wheel J', and between it and the wheel l'' on the shaft L is an idle-wheel j, to give wheel l'' the opposite direction of wheel K. It will be observed that shaft H' always revolves in one direction only; hence the spur-gear J carries its corresponding wheel K in the opposite direction. When the clutch is open, the wheel K revolves loosely on shaft L, as also does the wheel l'', and shaft L remains idle. When the clutch is thrown to the left hand, as shown in Fig. 2, the screw-rods O are raised by means of the worm gear-wheels O'. When the clutch is thrown to the right, then the rods O are lowered. This part of the apparatus is designed to adjust vertically the frame A, with the water-wheels, to the proper depth in the current by the motion of the wheels themselves.

On the outer end of the shaft H' is a pulley



*h*, from which motion is to be taken by a band connected to a drum on a counter-shaft to convey power to any machinery.

Whenever it becomes necessary to adjust the height of the frame A by means of the clutch, the force of the current operating on the wheels C will be conveyed to the elevating screw-rods O from the driving-shaft H' through the connecting-wheels J and K. It will sometimes be necessary that the frame should be raised above the water. To effect this I employ crank-handles P on the ends of the shaft L. When the water-wheels and frame A are small, the whole apparatus as geared can be turned by the handles.

To prevent the current from forcing the frame A downstream and to keep it in its proper position, anchoring-rods R are to be attached at one end to the corners by suitable fastenings *r* and the other ends secured on the shore on each side.

Whenever the bar M is required to be very long by the use of many water-wheels, then it will be necessary to have it sufficiently braced by ordinary means to sustain the weight.

That each water-wheel may do its work without being interfered with by the churning of its next neighbor, I place between the

wheels a diaphragm S, which forms separate flumes for the water-wheels.

I claim—

The combination of the frame A, supporting a series of water-wheels C, having spiral wings *c*, their shafts B being parallel with each other and the thread of the current and having beveled gears *b* on one end, a horizontal shaft D, placed transversely to the shafts B and having thereon beveled gears *d*, to mesh with the gears *b*, and a beveled gear D' on its end, the beveled gear E and vertical shaft E', having on its upper end the beveled gear *e'*, the beveled gear H and shaft H', having on it the two spur-wheels J J' and a driving-pulley *h*, the idle-wheel *j*, the spur-gears K and *j''*, and double clutch L' on the horizontal shaft L, having endless threads *o*, the worm-wheels O', and screw-rods O, connected to the frame A, all substantially as described, whereby the motion of the current-wheels will adjust the height of the frame by means of the clutch.

In testimony whereof I affix my signature in presence of two witnesses.

RICHARD E. GRAY.

Witnesses:

JAMES SMALL,  
W. A. SHORT.