

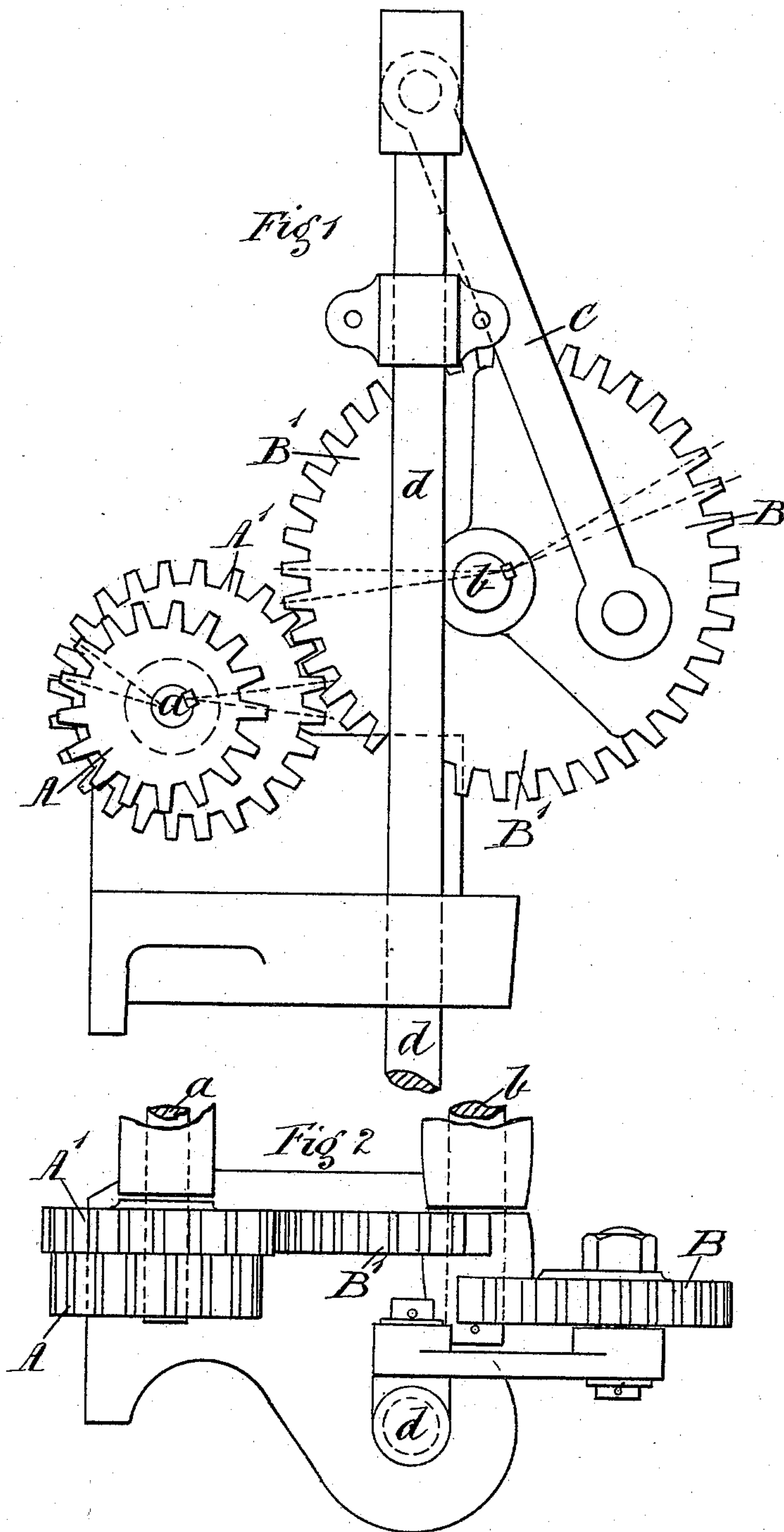
(No Model.)

2 Sheets—Sheet 1.

J. E. TOUCH.
GEARING.

No. 488,373.

Patented Dec. 20, 1892.



Witnesses.

Richard Edward Rawnsley
Henry Hughes Junr.

Inventor
John Edward Touch
per Henry Hughes
Attorney

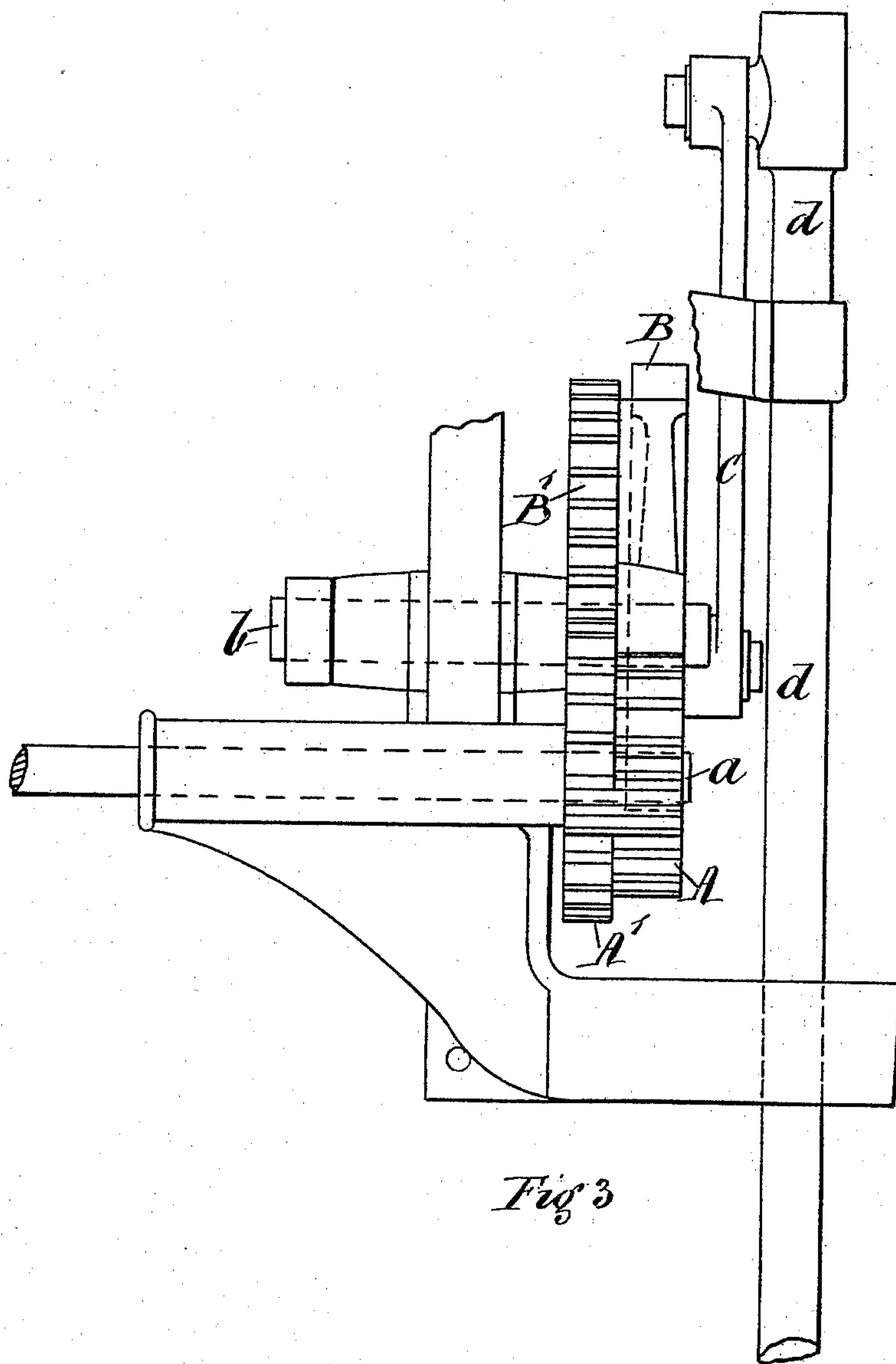
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UNITED STATES PATENT OFFICE.

JOHN EDWARD TOUCH, OF CHRISTCHURCH, NEW ZEALAND.

GEARING.

SPECIFICATION forming part of Letters Patent No. 488,373, dated December 20, 1892.

Application filed December 31, 1891. Serial No. 416,744. (No model.)

To all whom it may concern:

Be it known that I, JOHN EDWARD TOUCH, engineer, a British subject, residing at Sydenham, Christchurch, in the Colony of New Zealand, have invented a new and useful Improvement in Gearing for Driving Pumps, of which the following is a specification.

My invention relates to improvements in gearing for driving pumps, and has for its objects transmitting the driving power more efficiently and with simpler mechanism. It will be known that in driving pumps which have a reciprocating motion the work to be done is unevenly distributed throughout the delivery and the return stroke, more especially in pumps which have single action and a single barrel; for in such pumps the lift generally takes place during one stroke in which the power is applied to lifting the whole weight, but during the other stroke the power required is small, being chiefly employed in returning the rods and bucket ready for the next lift. In windmills and water wheels and where motive power whether effectively used or not is being constantly supplied great waste of power takes place on the return stroke of the pump without a corresponding useful effect, and several devices have been made use of and suggested to utilize and distribute the power more equally, and the object of my invention is to effect this by more simple means. I attain these objects by the mechanism illustrated in the accompanying drawings, in which,—

Figure 1. is an elevation showing my improved gearing, in which two driving pinions with varying radii are employed and arranged side by side and two segments of driving wheels with varying radii are made to gear into the same and in such a manner and position as to give a slow lift to the pump. Fig. 2. is a plan of the same. Fig. 3. is a side view of the same.

Referring to the drawings, *a* indicates the wind wheel shaft carrying the pinions A and A', which gear into the segments B and B',

respectively, and which segments are fixed to the shaft *b* and revolve with it.

C is a connecting rod driven by the segment B and B' and communicating a reciprocating motion to the pump bucket through the vertical rod *d*.

It will thus be seen that my invention consists in so designing and arranging the gearing that in one complete delivery and return stroke of the pump or revolution of the segments B and B', which produce the said delivery and return strokes, the windmill shaft on which the pinions A and A' are fixed makes two revolutions, thus increasing the power and consequently decreasing the speed of the pump; but the pinions A and A' are fixed relatively to one another in such a position that the teeth on the pinion (A) which have the smallest radius from the axle commence to gear with the teeth on the segment (B) having the largest radius from its axle, thus giving a great increase of power in lifting at the half stroke of the pump, but gradually diminishing such power to the end of the stroke, after which the return stroke commences, until at the half return stroke the teeth having the largest radius from the axle on pinion A' gear into the teeth having the smallest radius on the segment B', thus allowing the smallest amount of power to be used and the quickest speed attained on the return stroke. I thus attain in a simple manner one revolution of the driven pump wheel to two revolutions of the driving pinion, and this varied in such a manner throughout the revolutions that very great power is available to lift and deliver, and a proportionally small power exerted in returning for a fresh lift; that my improved gearing not only alters the speed of the delivery and return stroke of the pump, and consequently the power exerted on the same; but will enable the stroke of the pump to be slackened and the revolution of the windmill to be proportionally increased, also by increasing the number of pinions and proportionally increasing the size and number

of the driven segments, any desired proportion of the speeds may be obtained.

I am aware that some of the advantages in gearing sought to be effected by me have been
5 obtained by others in several ways, all more or less complicated, but

What I claim as novel and useful and desire to secure by Letters Patent is,—

In a windmill the combination of a wind-
10 mill shaft *a* and actuating rod *d*, and con-

necting rod C with wheels A A' and segments B and B' substantially as described herein and illustrated in the accompanying drawings.

J. EDWARD TOUCH.

Witnesses:

GEO. T. BOOTH,
Manufacturer, Christchurch, N. Z.

H. GREIG,
Commercial Traveler, Christchurch.