

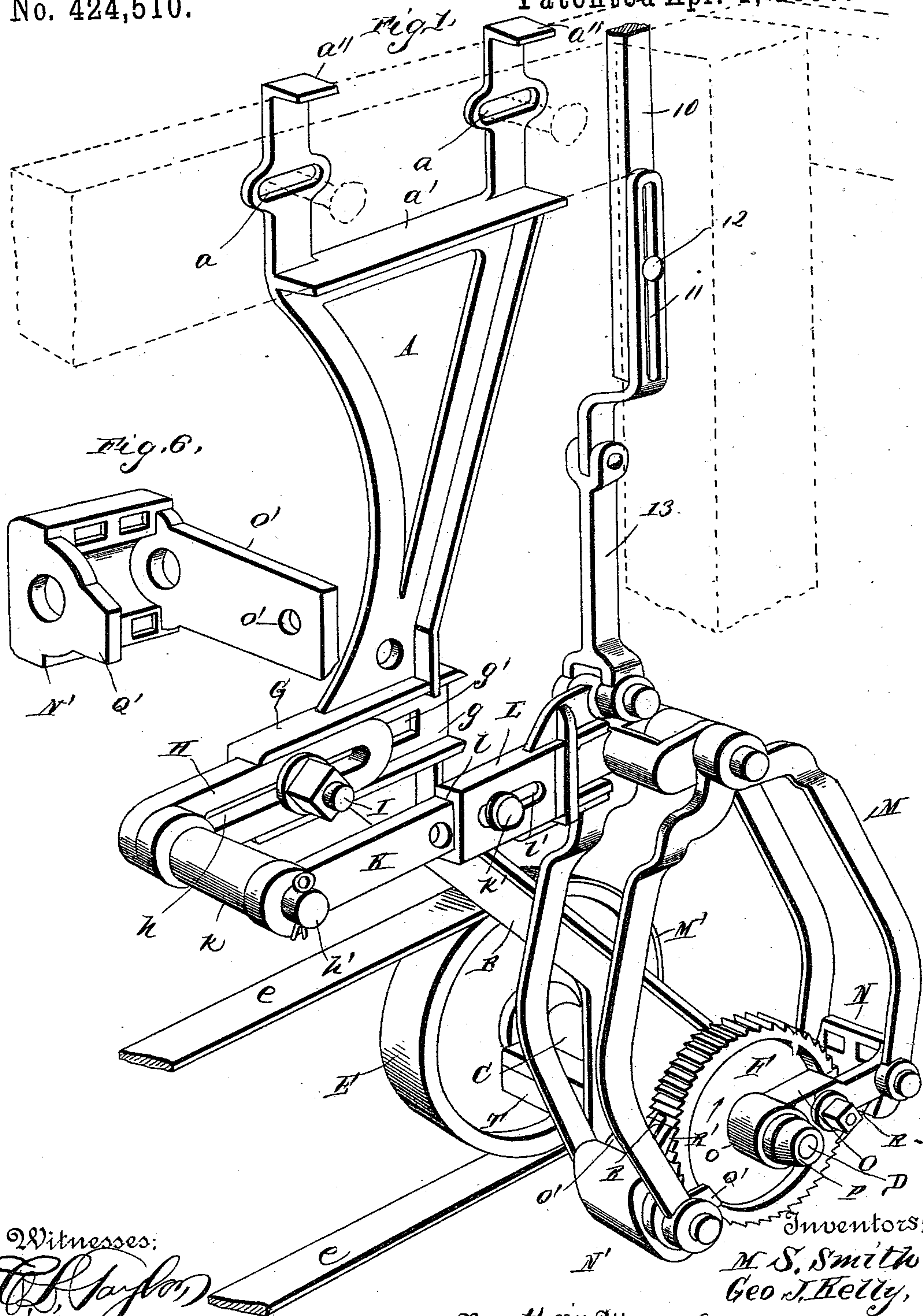
(No Model.)

2 Sheets—Sheet 1.

M. S. SMITH & G. J. KELLY.
MECHANISM FOR CONVERTING AND TRANSMITTING MOTION FROM
WINDMILLS, &c.

No. 424,510.

Patented Apr. 1, 1890.



Witnesses:
C. H. Taylor
H. E. Johnson

Inventors:
M. S. Smith,
Geo. J. Kelly,
By their Attorneys
Higdon & Higdon

(No Model.)

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Fig. 2.

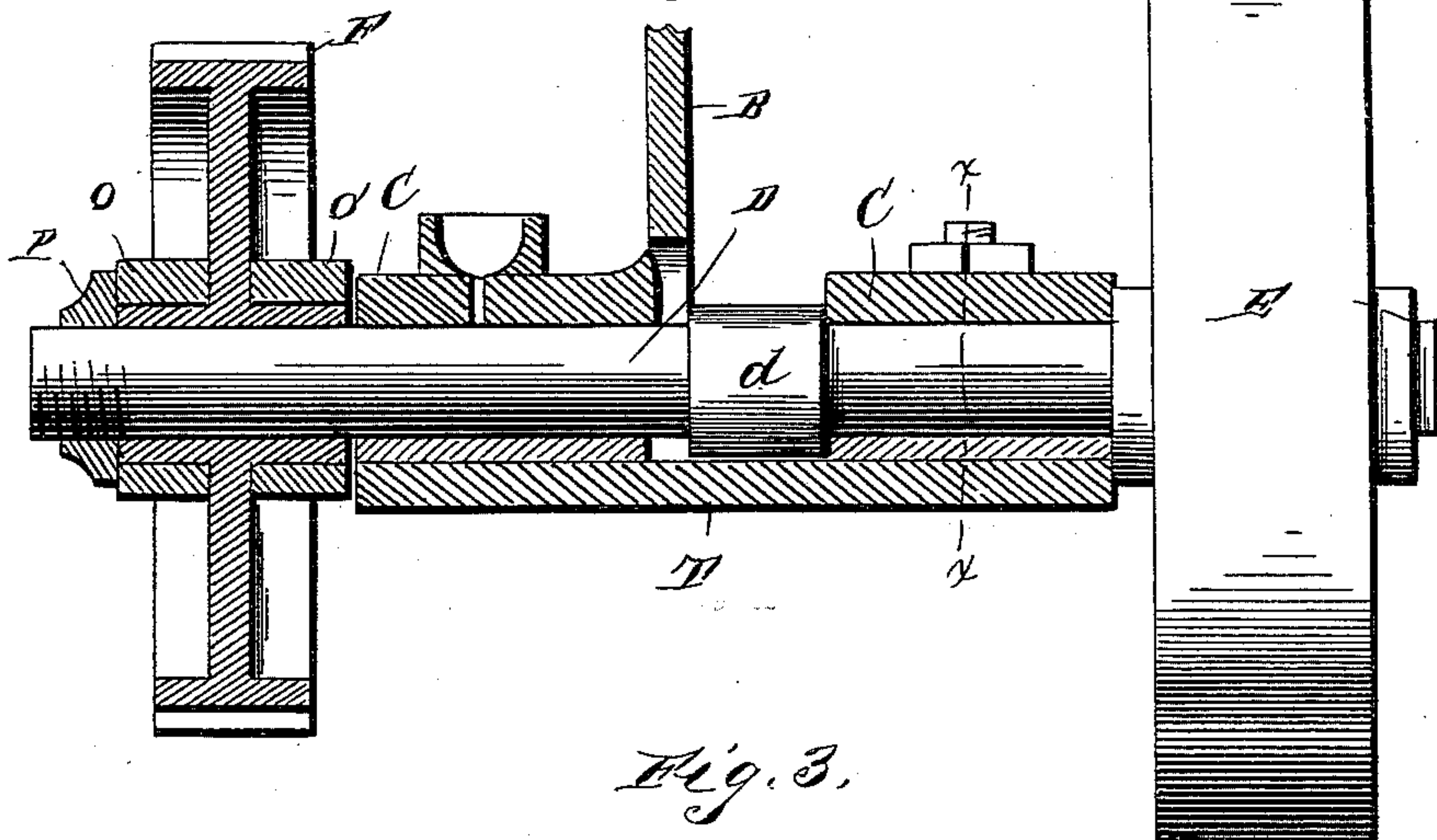


Fig. 3.

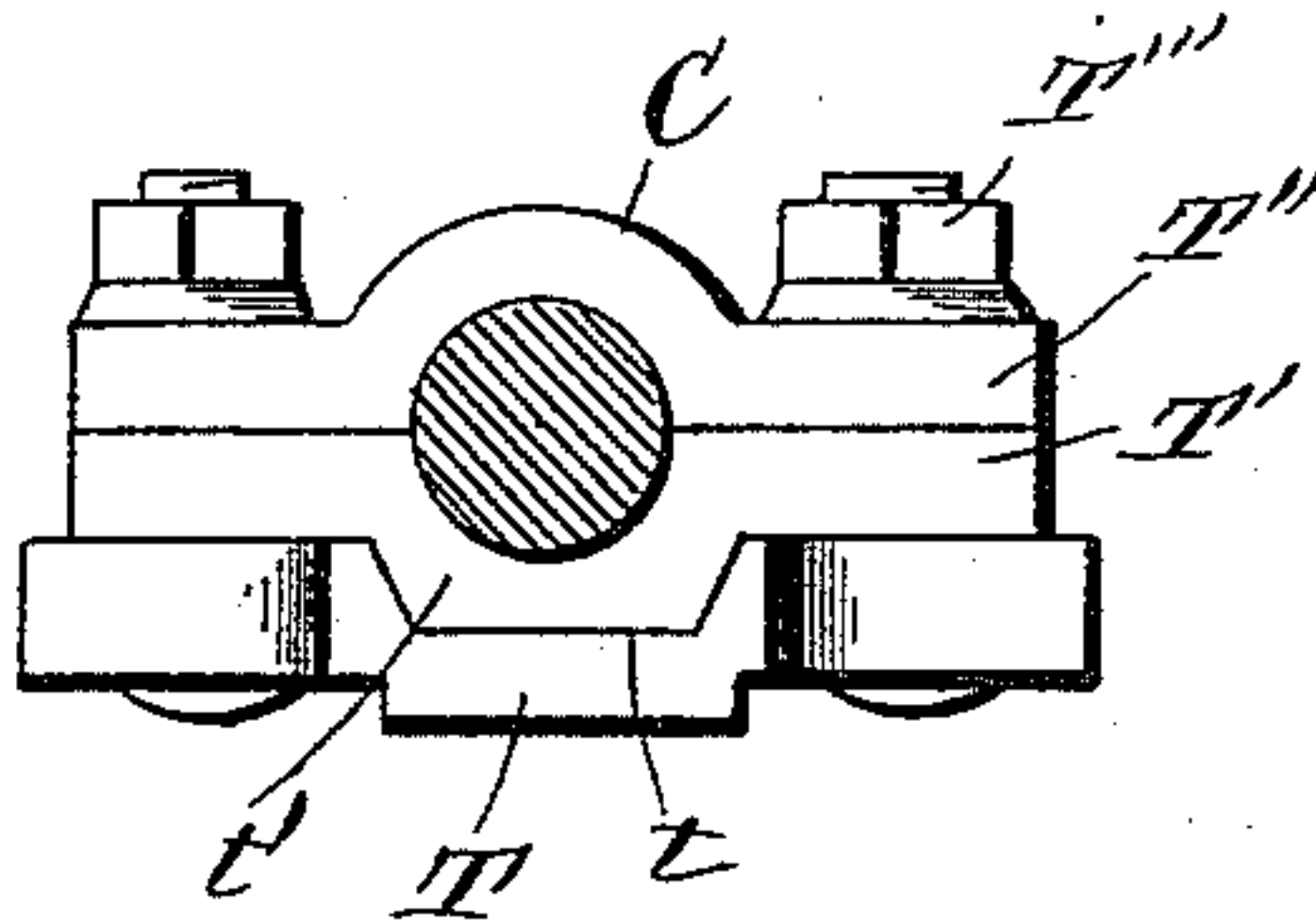


Fig. 4.

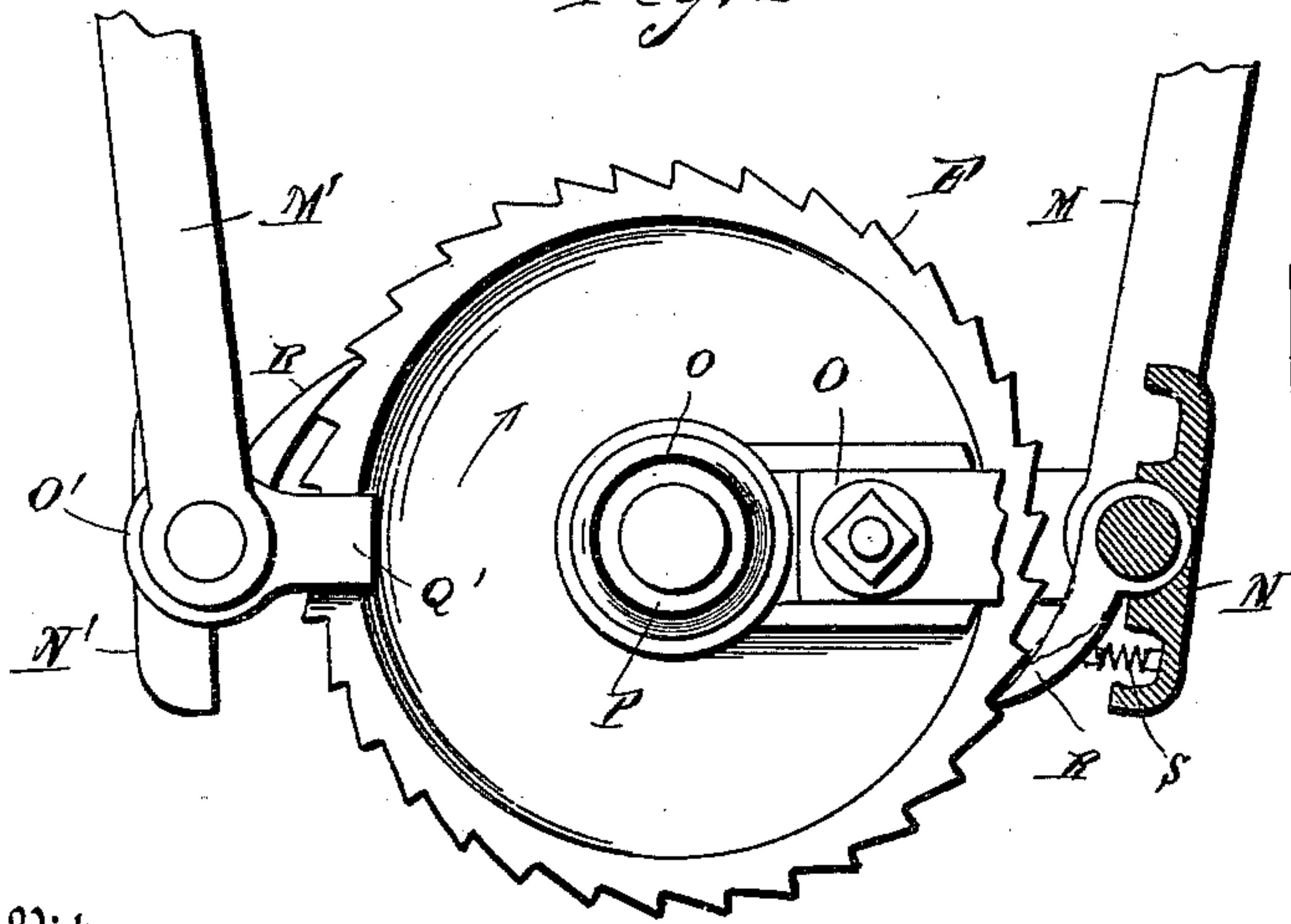
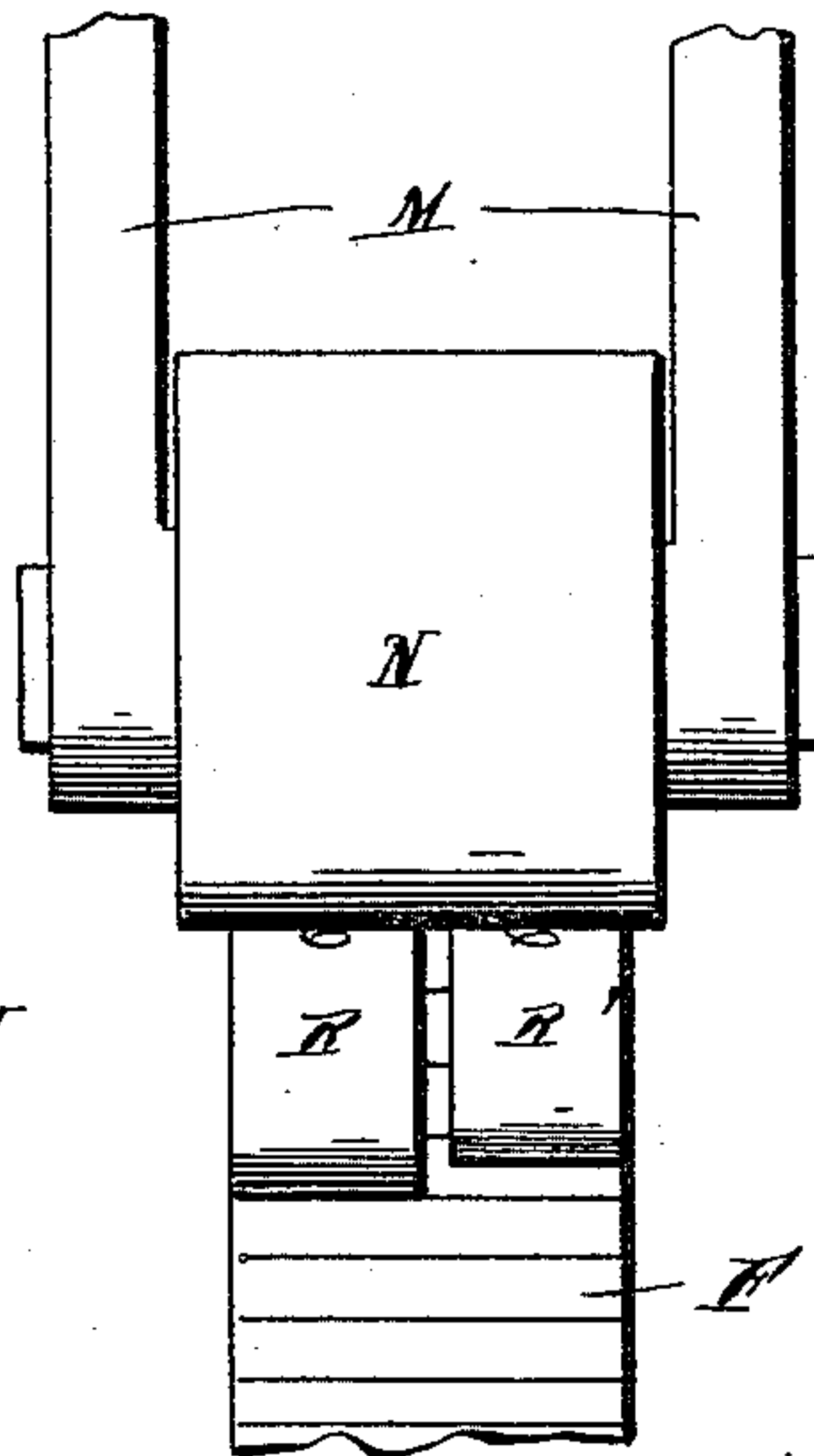


Fig. 5.



Witnesses:

C. L. Taylor
A. C. Johnson

Inventors:

M. S. Smith,
Geo. J. Kelly.

By their Attorneys

Higdon & Higdon

UNITED STATES PATENT OFFICE.

MILLARD S. SMITH AND GEORGE J. KELLY, OF STOCKVILLE, NEBRASKA.

MECHANISM FOR CONVERTING AND TRANSMITTING MOTION FROM WINDMILLS, &c.

SPECIFICATION forming part of Letters Patent No. 424,510, dated April 1, 1890.

Application filed October 1, 1889. Serial No. 325,689. (No model.)

To all whom it may concern:

Be it known that we, MILLARD S. SMITH and GEORGE J. KELLY, of Stockville, Frontier county, Nebraska, have invented certain new and useful Improvements in Mechanism for Converting Motion, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

Our invention relates to devices for converting motion; and it has for its object to change the reciprocating movement of the pump-shaft of a windmill or engine into a continuous rotary motion.

To this end it consists in a certain novel construction, which is fully described herein-after, and specifically pointed out in the claims.

In the drawings, Figure 1 is a perspective view of our invention. Fig. 2 is a transverse section taken through the main shaft. Fig. 3 is a detail sectional view through the journal of the main shaft on line $x\ x$ of Fig. 2. Fig. 4 is a detail side view, partly in section, of the ratchet-wheel and pawls. Fig. 5 is a detail edge view of the same to show the manner in which the pawls of different lengths engage the ratchet-wheel, and Fig. 6 is a detail view of one of the pivoted blocks.

The frame A, which supports our improved device for converting motion, is provided at its upper end with transverse slots $a\ a$, through which are passed bolts to secure the frame to a suitable horizontal bar of the windmill-tower, and said frame is also provided with a horizontal flange a' , to bear against the lower edge of the horizontal bar, and ears a'' , to bear upon the upper edge of the same. The frame is further provided at its lower end with an inclined arm B, carrying at its lower end journal-boxes C, in which is mounted the main shaft D, one end of which is provided with a band-wheel E, which is adapted to be connected by a belt e with any suitable machinery—such as a churn, washing-machine, corn-sheller, grindstone, &c. This shaft is provided between the journals C C with an enlargement or collar d , to prevent longitudinal movement thereof, and on the opposite end of the shaft from the band-wheel is keyed a ratchet-wheel F.

The main frame is provided with a horizontal arm G, having a groove g , in which fits a slide H, having a longitudinal slot h , which registers with a corresponding slot g' in the arm G, an adjusting-bolt I extending through said slots, and provided with a nut whereby the slide may be clamped in the desired position on the arm. Said slide carries a spindle h' , upon which is mounted a sleeve k , which is formed on the end of a swinging arm K, said swinging arm being provided with a slotted extension L, the free end of which is connected to the lower end of the pump-rod 10. The extension L is provided with a groove l to receive the arm K, and it is also provided with a slot l' , which registers with a corresponding slot in the arm K. A clamping-bolt k' engages said registering slots to hold the extension in the desired position. The slotted arm 11, which is secured by means of the adjusting-bolt 12 to the pump-rod, is connected to the extension by means of a link 13.

To the free end of the swinging arm are pivoted fingers M M', which are arranged in pairs, with their free ends on opposite sides of the ratchet-wheel, and blocks N N' are pivoted between the adjacent lower ends of said fingers and carry pawls to engage the ratchet-wheel.

An arm O is mounted on the hub of the ratchet-wheel, and is connected at its free end to the lower ends of the fingers M to hold the pawls, which are carried thereby, in position to engage the teeth of the ratchet-wheel, a similar arm O' being arranged on the opposite side of the ratchet-wheel and connected to the lower ends of the fingers M'. These arms O O' are preferably connected directly to the pivoted blocks N N', and are provided at their inner ends with boxes $o\ o'$ to embrace the hub of the ratchet-wheel, the box o being held in place by the nut P, while the box o' is held in place by the end of the journal C. The arms O O', as will be seen, are connected to one end of the blocks N N', and the opposite ends of said blocks carry guiding-ears Q Q', which bear against the sides of the ratchet-wheel to prevent unnecessary vibration of the parts.

Each block N N' carries two pivoted pawls—

a longer pawl R and a shorter pawl R'—small spiral springs S being arranged to normally hold the pawls in contact with the ratchet-wheel. The object in providing two pawls of different lengths is to prevent lost motion.

The horizontal plate T, which is formed integral with the lower end of the arm B, is provided with a groove *t*, in which fits a web *t'* on the under surface of the bed-plate T', and the cap-plate T'' and the bed-plate T' are secured to the plate T by means of bolts T'''.

The operation of our invention is as follows: When the pump-rod 10 is vertically reciprocated, the swinging arm K and the fingers M M' are operated, thereby causing the pawls, which are arranged on opposite sides of the ratchet-wheels, to alternately engage the same. When the free end of the arm K ascends, the pawls which are carried by the block N' engage the teeth of the ratchet-wheel and rotate the same in the direction indicated by the arrow in Fig. 1 and also in Fig. 4, the pawls carried by the block N at the same time slipping idly over the teeth of the ratchet-wheel, and when the free end of the arm K descends the pawls carried by the block N engage the ratchet-wheel, and the pawls carried by the block N' slip idly over the wheel. Thus it will be seen that the ratchet-wheel and the shaft to which it is connected are continuously rotated in one direction. When it is desired to lengthen the stroke, the extension L is loosened and moved toward the pivoted end of the arm K, the upper ends of the fingers remaining vertically over the center of the ratchet-wheel. By moving the slide H to the right or left the free end of the arm K may be arranged on either side of a vertical line through the center of the ratchet-wheel to overcome the irregular action caused by the counter-balance used on windmills and engines—that is, when the free end of said arm is arranged beyond the center of the wheel the pawls which are carried by the block N travel over a greater distance on the periphery of the ratchet-wheel than the pawls carried by the block N', thereby moving said wheel and the shaft a greater distance on the downstroke than on the upstroke. If the blocks meet or come in contact with each other at the extremity of the downstroke or at the extremity of the upstroke, the slotted arm 11 is adjusted vertically to remedy the evil.

By employing pawls of different lengths, as above described, the lost motion is almost imperceptible, as only a portion of the length of one of the teeth of the ratchet can be lost in a stroke.

The blocks N N' are interchangeable, being provided at each end with recesses *s* for the springs S, and therefore by reversing the ratchet-wheel and the pawls the shaft may be rotated in the opposite direction to that indicated in the drawings.

The slots *a a* enable the supporting-frame

to be adjusted laterally to bring the thrust of the pump-rod in alignment with the center of the ratchet-wheel or perpendicular to the arm K when the latter is at an intermediate point of its stroke.

Having thus described our invention, we claim—

1. The combination, with a reciprocating pump-rod, of the supporting-frame, the longitudinally-adjustable slide mounted on said frame, the swinging arm pivoted to said slide, said arm having the adjustable extension at its free end, the shaft mounted in the supporting-frame and having the ratchet-wheel, the adjustable arm 11, attached to the pump-rod, the link 13, connecting said arm to the adjustable extension, the fingers pivotally connected to the latter, the blocks pivoted to the said fingers and having the arms O O', journaled on the hub of the ratchet-wheel, the guiding-ears carried by the said blocks and engaging the sides of the ratchet-wheel, and pawls carried by the blocks and engaging opposite sides of the ratchet-wheel, substantially as described.

2. The combination, with a reciprocating pump-rod, of a supporting-frame provided with horizontal slots *a a*, engaged by bolts, whereby said frame is laterally adjustable, the driving-shaft mounted on said frame and carrying a ratchet-wheel, a swinging arm connected to said pump-rod and pivoted on the supporting-frame, and the fingers pivoted to the swinging arms and carrying pawls to engage said ratchet-wheel, substantially as specified.

3. The combination, with a reciprocating pump-rod, a ratchet-wheel carried by a suitable shaft, a swinging arm, and fingers pivoted to said arm and carrying pawls to engage said ratchet-wheel, of an adjustable extension fitted on said swinging arm, a slotted bar clamped on said pump-rod, and a connecting-link between said slotted bar and the adjustable extension, substantially as specified.

4. The combination, with a reciprocating pump-rod and a ratchet-wheel carried by a suitable shaft, of a swinging arm, the fingers pivoted to said arm and carrying pawls to engage said ratchet-wheel, and the slotted bar 11, secured to said pump-rod and connected by a link to the swinging arm, said slotted bar being longitudinally adjustable on the pump-rod, substantially as specified.

5. The combination, with a reciprocating pump-rod, of a supporting-frame, a ratchet-wheel mounted on said shaft, a longitudinally-adjustable slide mounted on said frame, a swinging arm pivoted to said slide and connected to said pump-rod, and the fingers pivoted to the swinging arm and carrying pawls to engage said ratchet-wheel, substantially as specified.

6. The combination, with a reciprocating pump-rod, of a supporting-frame provided

with a grooved and slotted bar G, the slide
H, fitting in said grooved bar and provided
with a slot to register with the slot therein,
said slots being engaged by an adjusting-
5 bolt, the swinging arm pivoted to said slide
and connected to the pump-rod, and the fin-
gers pivoted to said swinging arm and carry-
ing pawls to engage said ratchet-wheel, sub-
stantially as specified.

In testimony whereof we affix our signatures 10
in presence of two witnesses.

MILLARD S. SMITH.
GEORGE J. KELLY.

Witnesses:

GEO. H. STEWART,
E. M. KELLY.