

(No Model.)

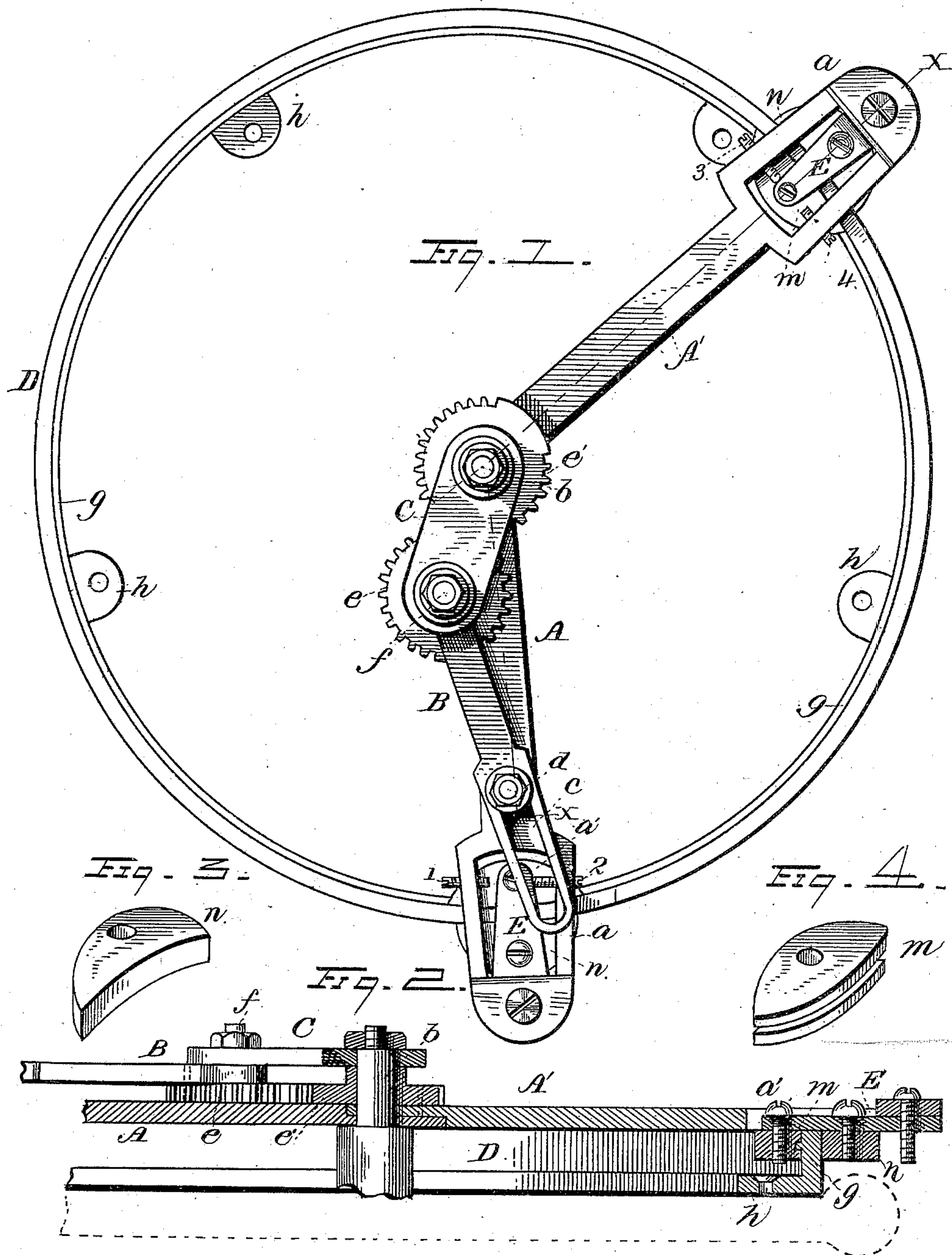
2 Sheets—Sheet 1.

R. B. HOLT & I. N. WALTON.

DEVICE FOR CONVERTING RECIPROCATING INTO ROTARY MOTION.

No. 335,702.

Patented Feb. 9, 1886.



WITNESSES:  
*Alex M. Clelland*  
*Luther Ferguson*

INVENTORS  
*Robert B. Holt and Isaac N. Walton*  
BY  
*Kaiser, Reynolds and Ellis*  
ATTORNEYS

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Fig. 5.

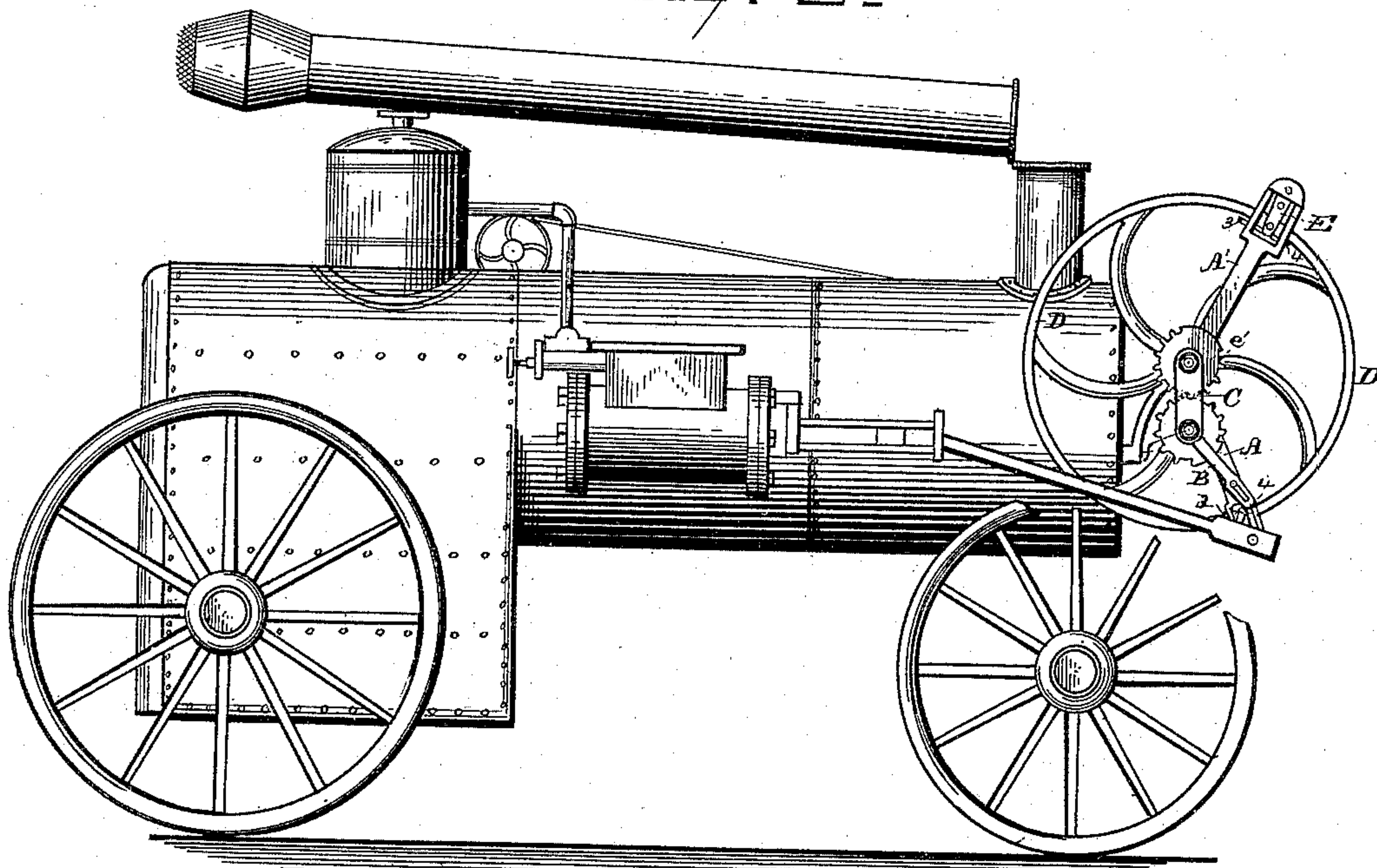
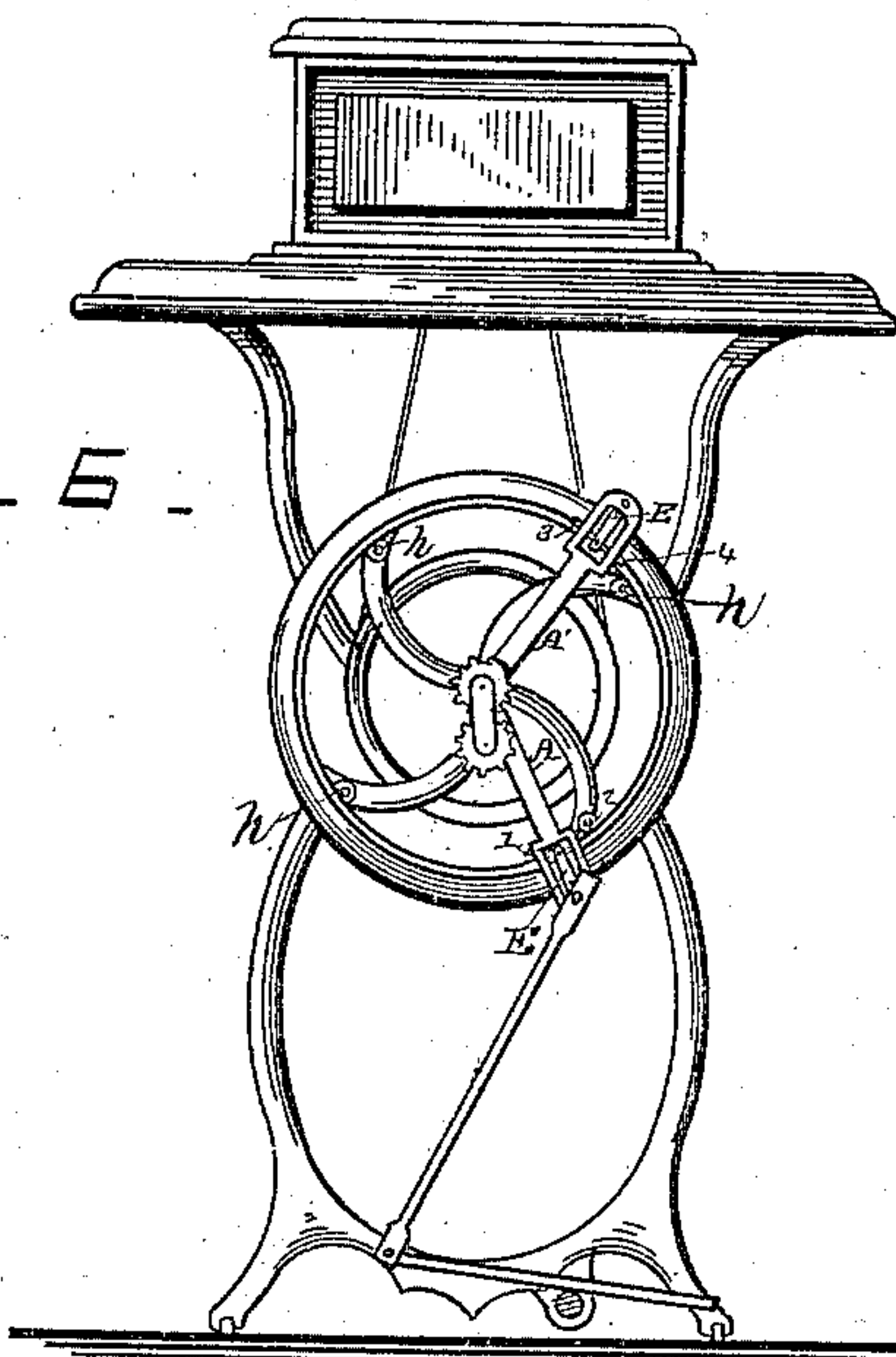


Fig. 6.



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# UNITED STATES PATENT OFFICE.

ROBERT B. HOLT AND ISAAC N. WALTON, OF ALLENSVILLE, KENTUCKY.

DEVICE FOR CONVERTING RECIPROCATING INTO ROTARY MOTION.

SPECIFICATION forming part of Letters Patent No. 335,702, dated February 9, 1886.

Application filed September 7, 1885. Serial No. 176,413. (No model.)

*To all whom it may concern:*

Be it known that we, ROBERT B. HOLT and ISAAC N. WALTON, citizens of the United States, residing at Allensville, in the county of Todd and State of Kentucky, have invented certain new and useful Improvements in Mechanism for Converting Reciprocating Motion into Rotary Motion; and we 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 improved mechanism for converting reciprocating motion into a uniformly accelerated rotary motion; and it consists, substantially, in the parts as constructed, their particular combination with each other, and in such other details as will hereinafter be distinctly described, and pointed out in the claims.

The invention has for its object to provide means by which machines—such as steam or traction engines, sawmill head-blocks, sewing-machines, bicycles, and the like—may be operated or propelled to derive the greatest amount of force from a minimum or least possible expenditure of power, thereby enhancing the working value of the machine and rendering it capable of performing the best results in a given time through the medium of a comparatively small primary source of energy or power. These objects we attain by the means illustrated in the accompanying sheets of drawings, in which—

Figure 1 represents a side view of mechanism by which our invention is carried into effect, and Fig. 2 is a sectional view thereof on the line *xx*. Figs. 3 and 4 are perspective views in detail, to more clearly indicate the construction of the friction jaws or clutch. Fig. 5 represents a side elevation of a traction-engine in connection with which our improvements are embodied; and Fig. 6 is an end elevation of a sewing-machine, showing the application thereto of our invention.

In the practice of our invention, in connection with machines of the character referred to, the force which actuates the driving-wheel to rotate always acts at right angles to the axis of rotation of such wheel, while the connection of the mechanism we employ for rotating the wheel is made directly, or nearly

so, with the outer edge or rim thereof, instead of to the axle or shaft, thus obtaining a maximum degree of leverage by which no loss of motion is incurred in the machine being driven, whether the stroke of the connecting-rod be increased or diminished.

By the use of our invention no dead-center occurs in the motion of the driving-wheel, as the parts are so arranged with respect to each other as to be thoroughly compensating in their action, and the number of advantages possessed thereby will be readily apparent to the skilled mechanic.

Referring to the several parts by the letters marked thereon, A and A' represent two arms, each having an enlarged end, *a*, in which is formed a slot, *a'*. The opposite or inner end of each arm is formed or provided with a collar or sleeve that is designed to fit over the end of the shaft or axle *b* of the driving-wheel of a machine, thus providing a bearing for the arms to turn or work upon.

B represents a supplemental or auxiliary arm, which is somewhat shorter than the main arms, and is formed at its outer end with a slot, *c*, as shown, by which it is free to work upon a stud, *d*, projecting upwardly from arm A, and thus conform itself to the movement of the latter, and at the same time the supplemental arm will communicate the force of motion received from arm A to arm A'. This means of communication is effected through the medium of a pinion, *e*, rigidly secured to the inner end of the supplemental arm, and which engages a pinion, *e'*, secured in like manner to the corresponding end of arm A'. The supplemental arm, together with its pinion, has its bearing upon a pin, *f*, held by a sheath or plate, C, as shown.

D represents a circular metallic band or ring provided on its inner circumference or surface with a continuous flange or bead, *g*, and formed at suitable points with perforated lugs *h*, by which attachment thereof may be made to the rim or spokes of the driving-wheel of the machine to be driven. The outer slotted ends of the two main arms extend somewhat beyond the circumference of the band D, and rest upon its side or edge, as shown, and pivoted to the end of each arm is a link, E, which extends lengthwise of the slot *a'*, while passing through the adjacent sides of the slots



are set-screws 1 2 and 3 4. These screws are for the purpose of adjusting or limiting the movement of the links E in the manner and for the purpose hereinafter described.

5 Pivoted to the links E, at opposite sides of the band D, are friction-blocks *m n m n*, the outer ones being slightly concave in conformity to the contour of the band, and the inner ones being convex and grooved to both conform to the shape of the band and to embrace the flange or bead *g*, upon which it moves and is guided.

Each pair of jaws constitutes a clutch for gripping the band between them.

15 It will be evident that by adjusting the set-screws 1 2 and 3 4 the links E may be either extended or limited in their movement, and the friction between the clutches and band thus increased or diminished.

20 Figs. 3 and 4 clearly indicate the construction of the two jaws constituting a clutch.

The operation of our invention is as follows: Presuming the device as shown in Fig. 1 to be attached to the side of the driving-wheel of a machine, or, by referring to Figs. 5 and 6, it will be seen that the proper connection of the piston or connecting rod having been made to the outer end of arm A, and a reciprocating motion imparted to such rod, the action will be as follows: Upon a forward motion of the rod the arm A will be sent forward, while simultaneously with such movement the link E, carried by such arm, will be carried slightly backward on its pivot, thereby causing the jaws *m n* to clutch the band D and impart to the band, and consequently the wheel to which it is attached, a rotary motion. During this action of the arm A movement is imparted to the supplemental arm B, and thence, through the medium of pinions *e e'*, communicated to the arm A', causing this latter arm to move upward. The link E of arm A' moves oppositely to the link of the arm A with each forward and return stroke, and consequently while the clutch of one arm is acting to turn the wheel that of the other arm is relaxed and being carried back to take up the movement, and so on successively, thus absolutely preventing any loss of motion in the machine being driven, and compensating one for the other in overcoming dead-centers.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

55 1. In mechanism for converting reciprocating motion into rotary motion, the combination of a pair of pivoted arms, an auxiliary arm, a friction-clutch at the end of each main arm, and an adjustable link, substantially as described.

60 2. In mechanism for converting motion, the combination, with a band or wheel, of a pair of arms pivoted to the axle thereof, an auxiliary arm and intermediate connections, friction-clutches at the end of each main arm, and devices for regulating said clutches, substantially as described.

3. In mechanism for converting reciprocating motion into rotary motion, the combination of a band for attachment to a wheel, two main arms pivoted to the shaft of such wheel, an auxiliary arm, intermediate motion-transmitting devices, friction-clutches attached to the main arms and embracing the band, and adjusting mechanism for regulating the clutches, substantially as described. 75

4. The combination, with a band having lugs for attachment to a driving-wheel, and formed with an inner continuous bead, of centrally-pivoted arms, an auxiliary arm and motion-transmitting devices, a friction-clutch at the end of each main arm, constituted of two jaws conforming to and embracing the band-adjusting devices, and a pivoted connecting-link by which each pair of jaws is operated successively to clutch the band in the manner and for the purpose described. 85

5. The combination, with the main arms and auxiliary arm, of a pair of jaws of the end of each main arm, a connecting-link for each pair, and set-screws for limiting the movement of the links, substantially as described. 90

6. The combination, with the band having the inner bead, of the main arms and auxiliary arm, the outer jaws, the inner jaws grooved to fit the bead, the connecting-link, and adjusting-screws, substantially as described. 95

7. The combination, with the main arms formed with slots in their outer ends, one of which arms is provided with a stud, of the auxiliary arm having its outer end slotted to fit over the stud, the engaging pinions, the friction-clutches, the pivoted connecting-links, and adjusting-screws, substantially as described. 105

8. The combination, with the main arms, constructed as described, of the friction-jaws, intermediate motion-transmitting devices, the connecting-links, and adjusting-screws, substantially as described. 110

9. The combination, with the band and the main arms and auxiliary arm, of two pairs of jaws embracing the band and the link connecting each pair, substantially as described. 115

10. The combination of the band having inner flange, the two main arms formed with slots in their outer ends, the auxiliary arm, pivoted as described, and slotted at its outer end to fit a stud on one of the main arms, the pinions *e* and *e'*, the links pivoted to the outer end of the main arms, the jaws formed to fit the band on opposite sides, the same being pivoted to the links, and the set-screws for adjusting the links to regulate the jaws, substantially as shown and set forth. 125

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

ROBERT B. HOLT.  
ISAAC N. WALTON.

Witnesses:

H. B. SMALL,  
F. L. ANDERSON.