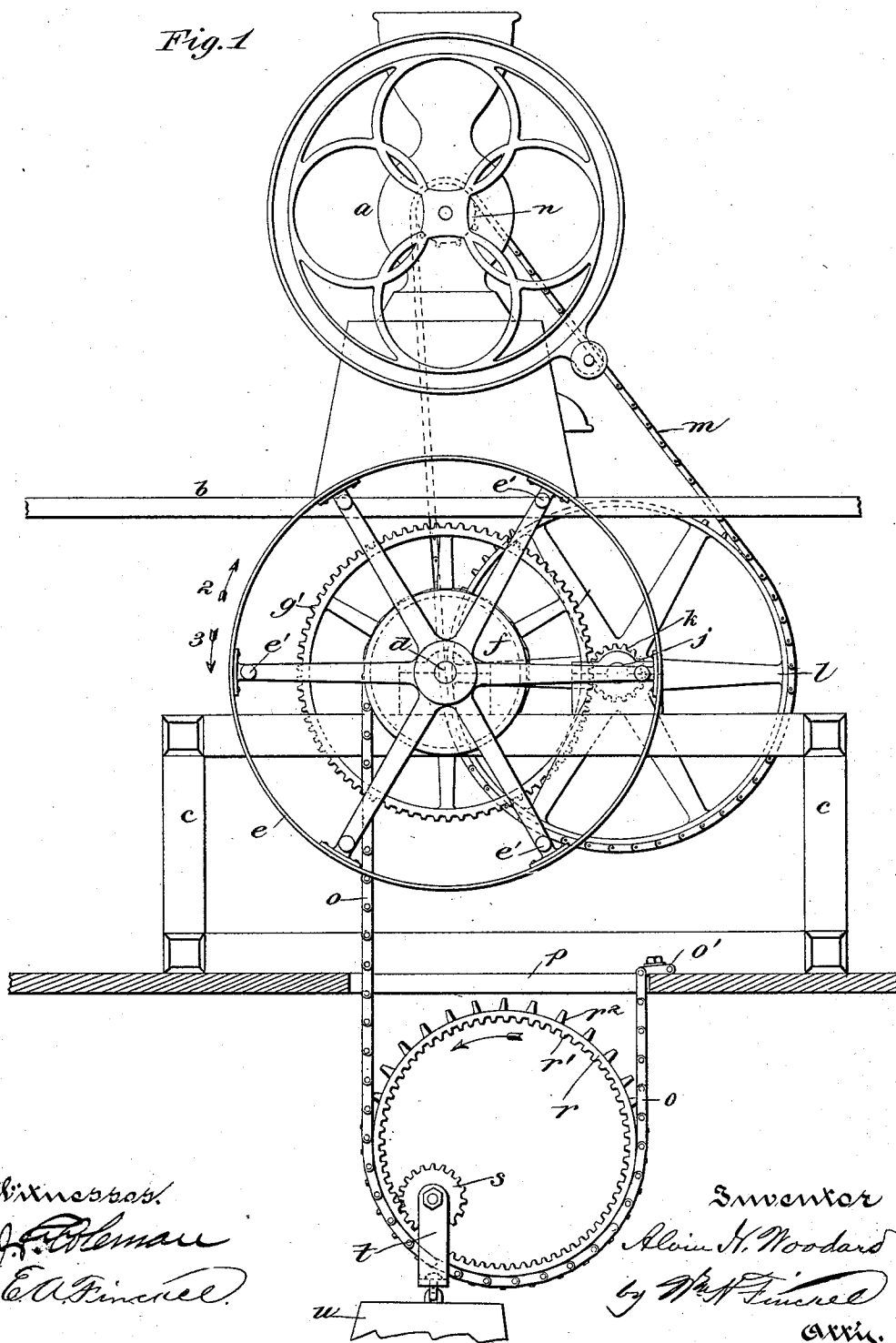


A. N. WOODARD.
MECHANICAL MOVEMENT.

No. 539,846.

Patented May 28, 1895.

Fig. 1



Witnesses:
J. A. Coleman
E. A. Pinard

Inventor
Alvin H. Woodard
by W. J. Finner
att'y.

(No Model.)

2 Sheets—Sheet 2.

A. N. WOODARD.
MECHANICAL MOVEMENT.

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Fig. 2

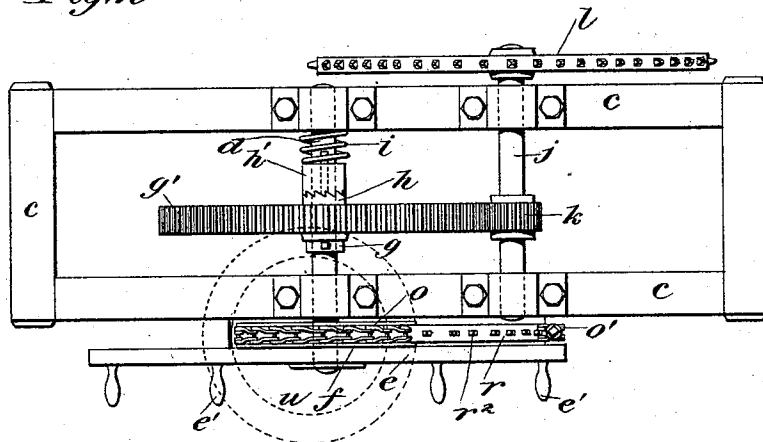
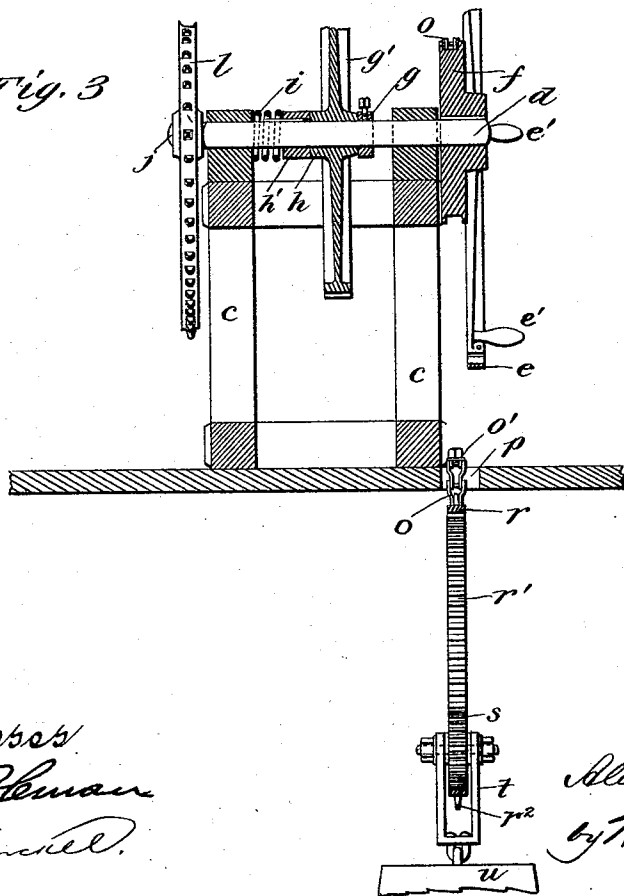


Fig. 3



Witnesses
J. F. Coleman
E. A. Kinchel.

Inventor
Alvin N. Woodard
by W. F. Kinchel
att'y.

UNITED STATES PATENT OFFICE.

ALVIN N. WOODARD, OF MANSFIELD, OHIO, ASSIGNOR OF ONE-HALF TO
VENIAH C. ROUTZAHN, OF SAME PLACE.

MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 539,846, dated May 28, 1895.

Application filed December 15, 1894. Serial No. 531,891. (No model.)

To all whom it may concern:

Be it known that I, ALVIN N. WOODARD, a citizen of the United States, residing at Mansfield, in the county of Richland and State of Ohio, have invented a certain new and useful Improvement in Mechanical Movements, of which the following is a full, clear, and exact description.

The object of this invention is to provide a mechanical movement by which power may be transmitted through differential or speed-multiplying gearing to a machine to be driven.

The principle of the invention is illustrated in an internal gear within which is a rolling pinion from which a weight is suspended, the said gear having external sprockets, and being suspended within a sprocket chain which is fixed immovably at one end and has its other end secured and wound about a rotating drum which is fast to a shaft. This shaft may be rotated by hand to wind the chain about it, and the said shaft is rotated in the opposite direction by allowing the suspended weight to act by gravity and rotate the gear ring. Inasmuch as the weight's pinion has a constantly shifting center of gravity in the internal gear, the pinion acts not only to throw its weight upon the chain, but also to exert a pulling force thereon, thereby increasing its effective force in unwinding the chain to generate power; and when in re-winding the weight is shifted to the fixed side of the chain, and its pinion climbs the gear ring on that side, by the shifting of the center of gravity, there is a decrease in the dead weight to be lifted, and thus the machine is rewound or reset with less expenditure of force and very much more easily than were the weight to be lifted bodily. The power is taken off by gearing with a countershaft or otherwise as may be desirable or convenient.

Having thus stated the nature and principle of my invention, I will proceed now to describe the best mode in which I have contemplated applying that principle, and then will particularly point out and distinctly claim the part, improvement or combination which I claim as my invention.

In the accompanying drawings, illustrating my invention, in the several figures of which like parts are similarly designated, Figure 1

is a side elevation assembled with a grinding-mill. Fig. 2 is a top plan view omitting the grinding-mill, and Fig. 3 is a transverse vertical section.

I will describe my invention as applied as a motor for a grinding mill, *a* being the mill, and *b* a counter upon which it is erected. A suitable frame *c* is placed beneath the counter, and upon it is mounted a horizontal shaft *d*, on which is fixed a hand-wheel *e*, having knobs *e'*, a drum *f*, and a collar *g*. Next the collar and loose on the shaft *d*, is a gear-wheel *g'*, whose hub has the clutch member *h*, the other member *h'* of such clutch being splined to the shaft and being held in engagement with the clutch member *h* by means of a spring *i* coiled about the shaft. The counter-shaft *j* is also mounted horizontally upon the frame *c* and is supplied with a fast pinion *k* in mesh with the gear-wheel *g'*; and this shaft *j* is provided with a sprocket wheel *l*, through which the motion may be transmitted to the mill by means of a sprocket chain *m* passed about a sprocket wheel *n* on the mill shaft. Shown in dotted lines in Fig. 1.

I wish to observe here that I do not limit my invention to the manner of transmitting the power of the shaft *d*, but for illustration, I have described this simple means as one that is convenient and readily available and very efficient.

A sprocket chain *o* is fastened by one end to the drum *f*, and falls thence downwardly, as through an opening *p* in the floor, and the other end of said chain is made fast, as at *o'*, to some stationary objects, as for example, the floor, at a point on the other side of the drum from that from which the chain *o* falls. Within the loop of the chain thus formed is arranged the combined internal gear and sprocket wheel *r* of this invention. As will be seen, the preferred form of this device is a ring, and internally it is provided with the spurs or teeth *r'*, while externally it is provided with the sprockets *r²*. These sprockets *r²* engage the links of the chain *o*. A pinion *s* is arranged within this ring and its teeth mesh with the teeth *r'* of said ring. This pinion is supported in a clevis or loop *t* from which is suspended the weight *u*.

The proportions between the drum *f* and the

ring r may be varied, but the best results will be obtained by having a ring of considerably larger diameter than the drum; and so also, the proportions between the internal gear of the ring and the pinion s may be varied, but the best results may be obtained by having a pinion of considerably larger diameter than that shown in the drawings, although the proportions shown in the drawings are effective.

10 The operation is as follows: By turning the hand-wheel e in the direction of arrow 2, the chain will be wound up upon the drum; and in the act of so winding up the chain, the center of gravity of the suspended weight will be changed to the right, Fig. 1, and its pinion s will exert a pulling force upon the said ring to rotate it in the direction of the rising chain, thereby decreasing the dead weight to be lifted, and hence facilitating the winding of the drum. The pull in this instance is against a fixed point and is distributed to a moving point. When the rotation of the shaft d ceases, the tendency of the weight is to find its normal center of gravity and thereafter, if the wheel be turned in the direction of arrow 3, so as to start the machine to put forth its power, the weight acts upon the ring through its pinion s , and said pinion climbs up the other side of the gear r' away from the fixed end of the chain, as indicated in Fig. 1, and exerts a pulling force upon the rolling ring, and thus is added to the force of the weight this pulling force, to effect the rapid and pow-

erful rotation of the shaft. By this shifting of the centers of gravity of the weight, there is added to the effective force of the weight nearly two-thirds increase.

What I claim is—

1. A mechanical movement comprising a chain made fast at one end and applied to a rotatable body at the other end, a combined internal gear and sprocket wheel arranged in the loop of the chain, and a weight suspended from said wheel and connected therewith by means of a pinion, substantially as and for the purpose described.

2. A mechanical movement comprising a shaft, a drum thereon and a hand-wheel for manually operating the said shaft and drum, a chain made fast to said drum at one end and having its other end made fast to a fixed body at a point located in a plane on the side of the drum opposite that from which the chain descends from the drum, a combined internal gear and sprocket wheel arranged in the loop of such chain and a weight suspended from said wheel through the medium of a pinion, substantially as and for the purpose described.

In testimony whereof I have hereunto set my hand this 14th day of December, A. D. 1894.

ALVIN N. WOODARD.

Witnesses:

WM. H. FINCKEL,
HARRY Y. DAVIS.