

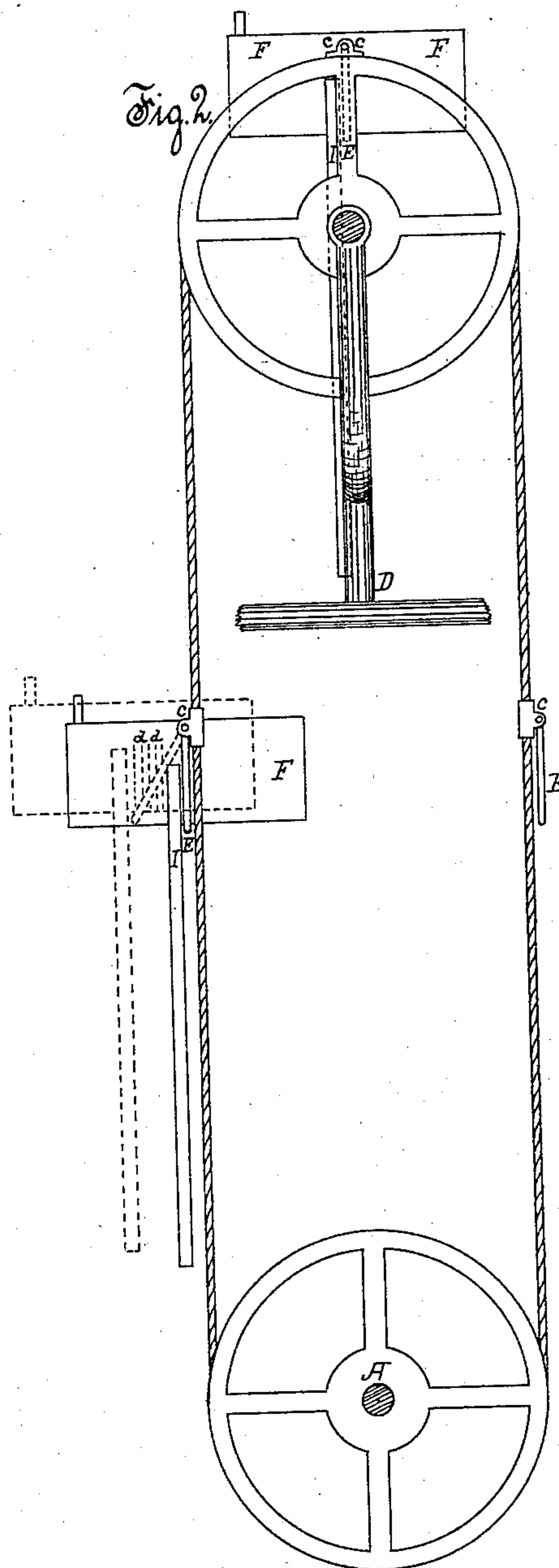
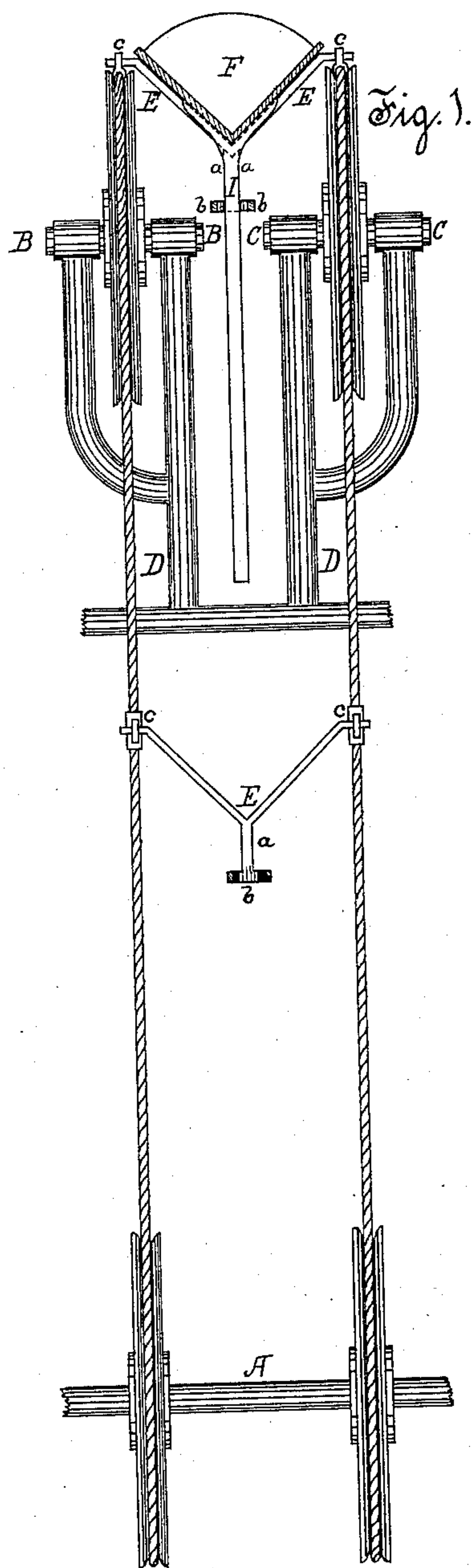
(No Model.)

4 Sheets—Sheet 1.

O. N. EATON.  
ENDLESS HOD ELEVATOR.

No. 287,013.

Patented Oct. 23, 1883.



Witnesses:

Plurien Ford  
 Jacob Pettig

Inventor:

Oliver N. Eaton.

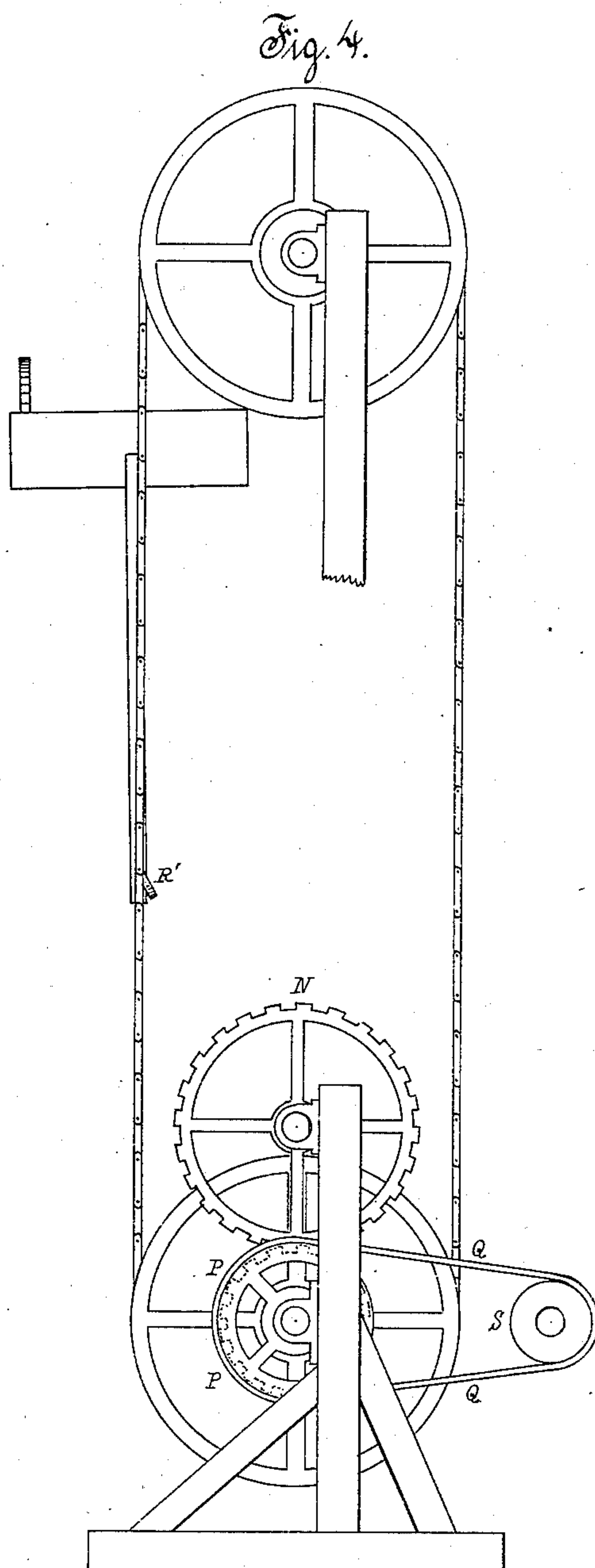
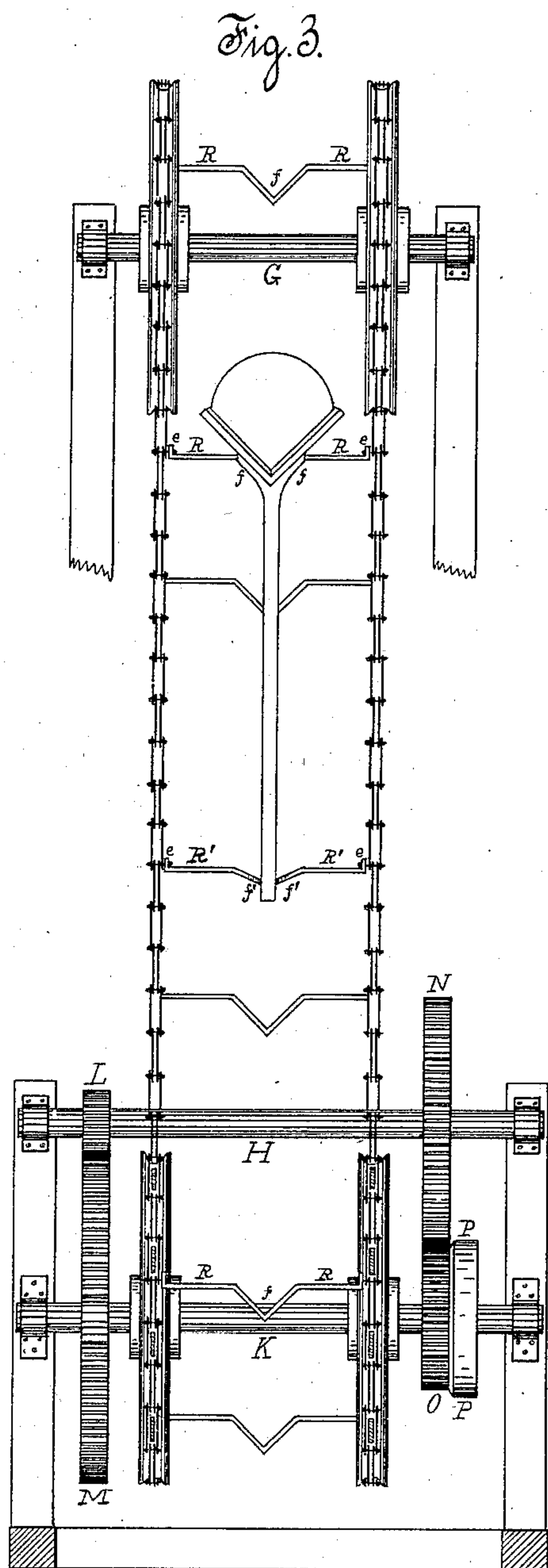
(No Model.)

4 Sheets—Sheet 2.

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Witnesses:

J. M. Ford  
Jacob R. R. R.

Inventor:

Oliver N. Eaton

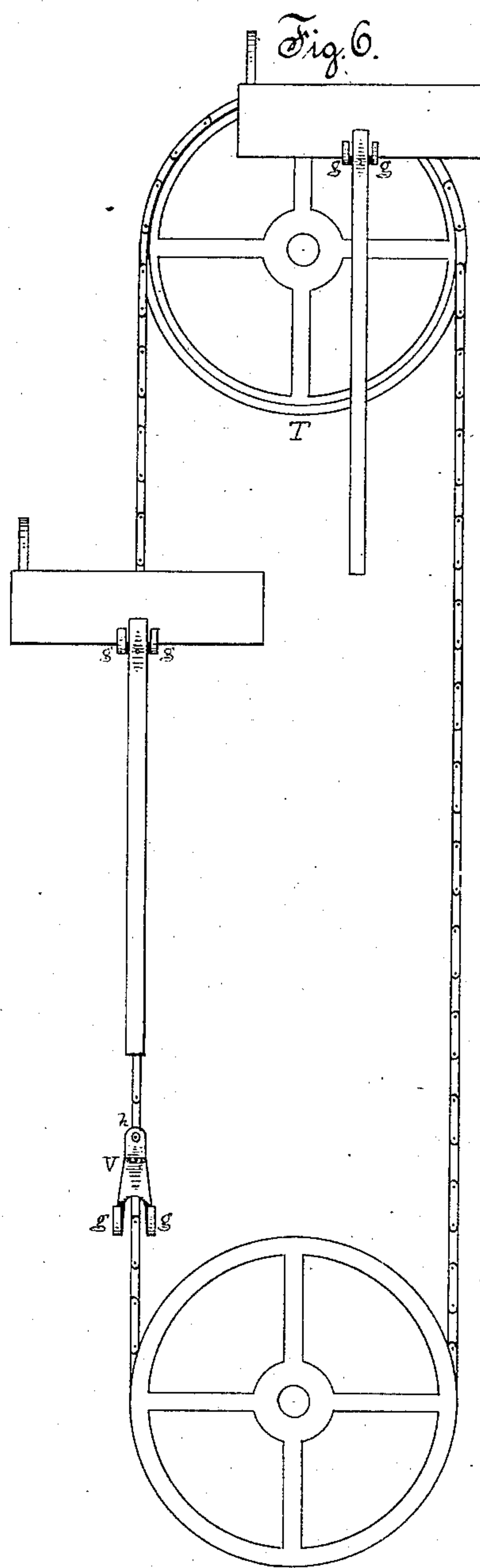
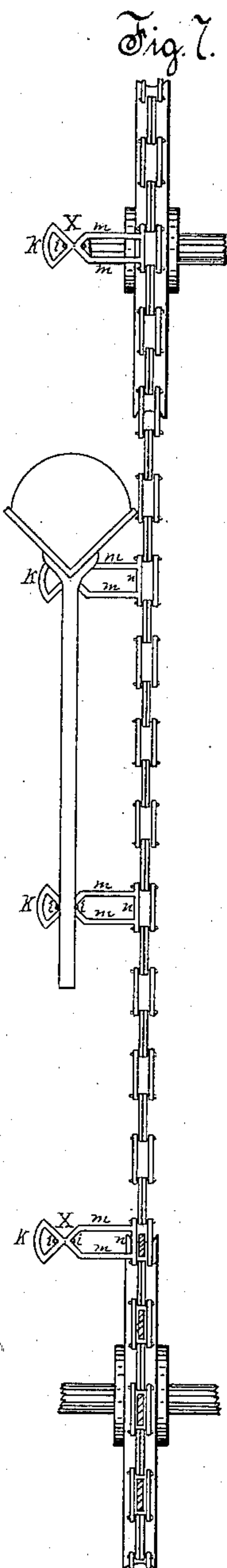
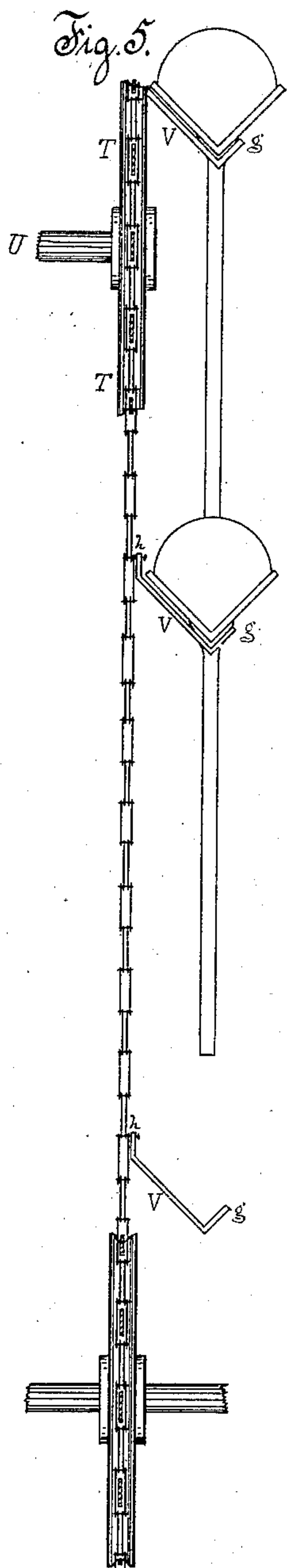
(No Model.)

4 Sheets—Sheet 3.

O. N. EATON.  
ENDLESS HOD ELEVATOR.

No. 287,013.

Patented Oct. 23, 1883.



Witnesses:

Almon Ford  
Jacob Rettig

Inventor:

Oliver N. Eaton



(No Model.)

4 Sheets—Sheet 4.

O. N. EATON.  
ENDLESS HOD ELEVATOR.

No. 287,013.

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Fig. 8.

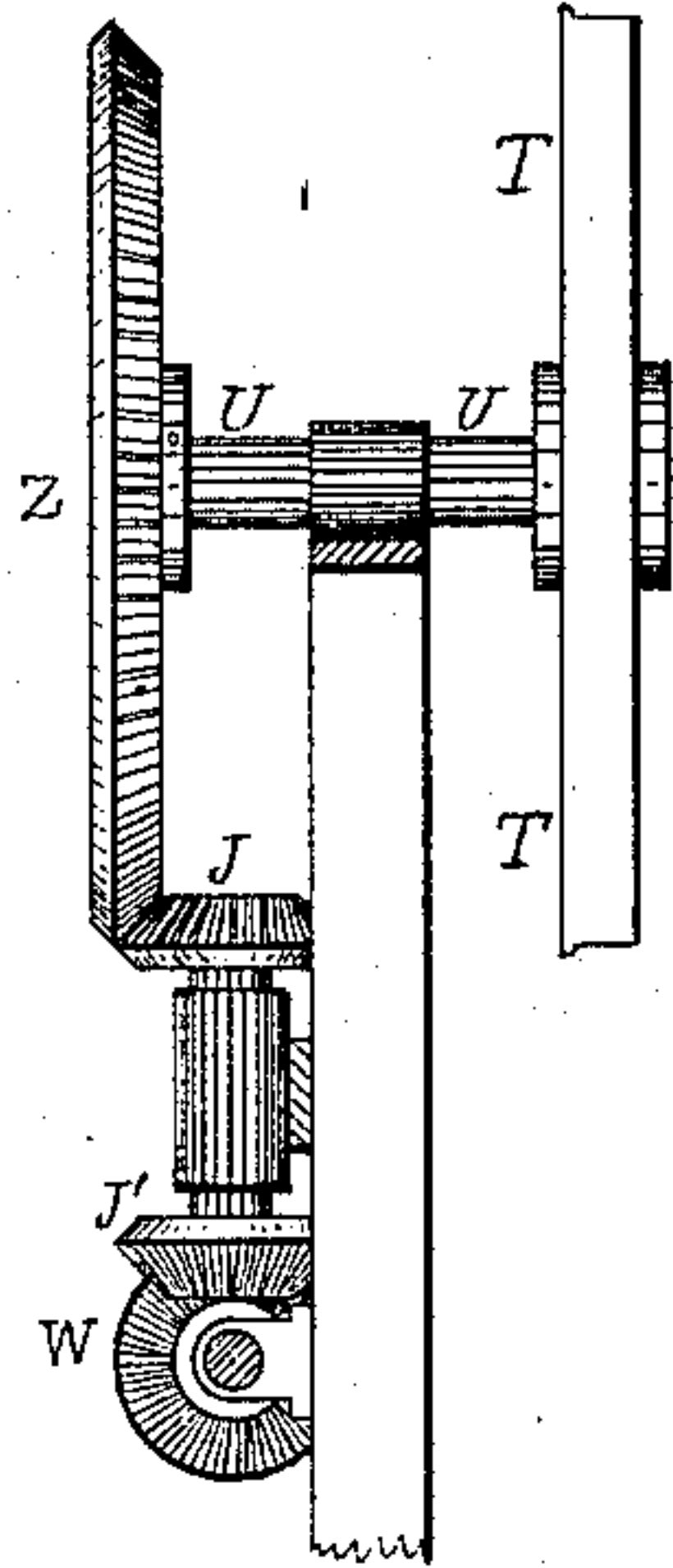


Fig. 9.

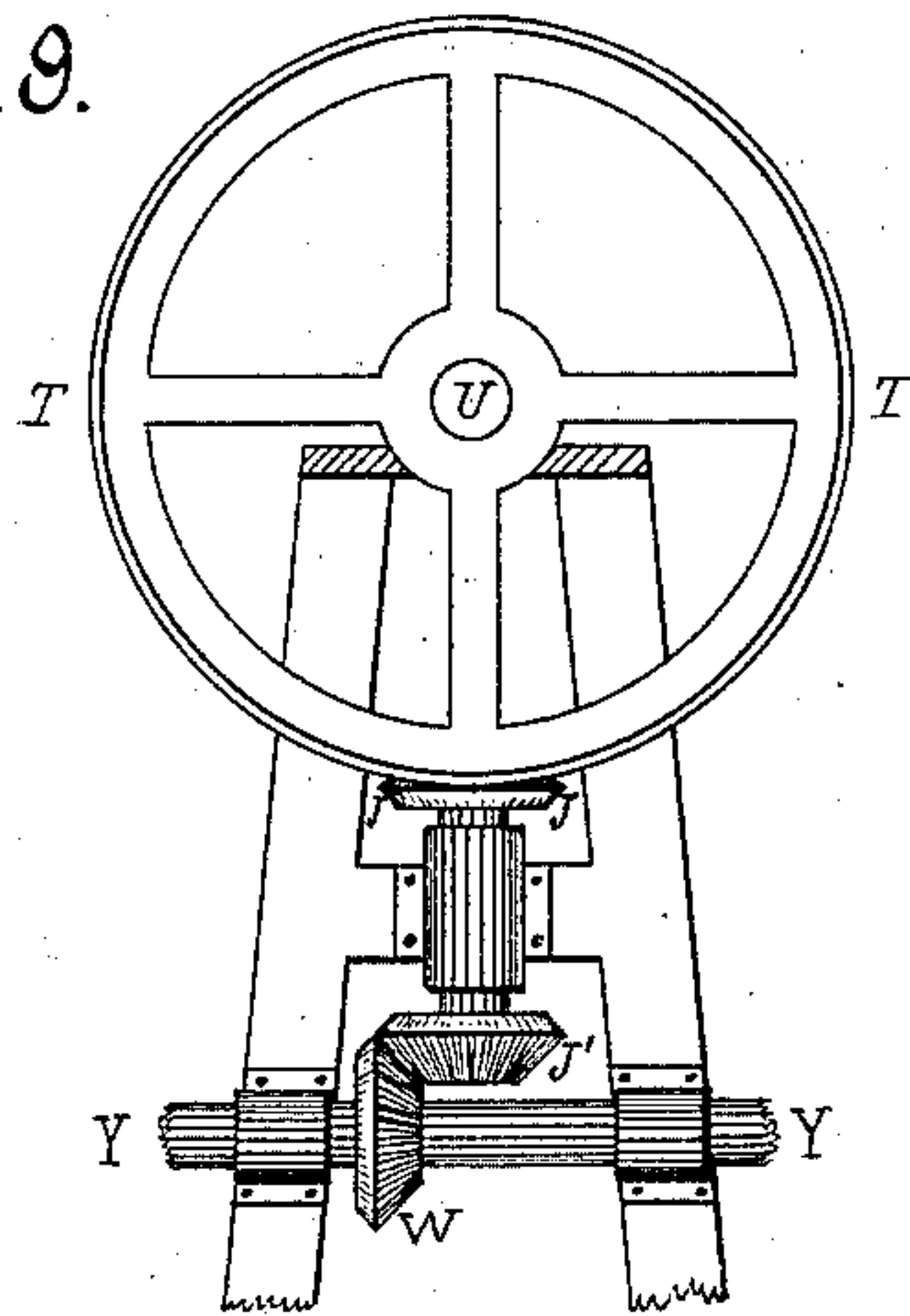


Fig. 12.

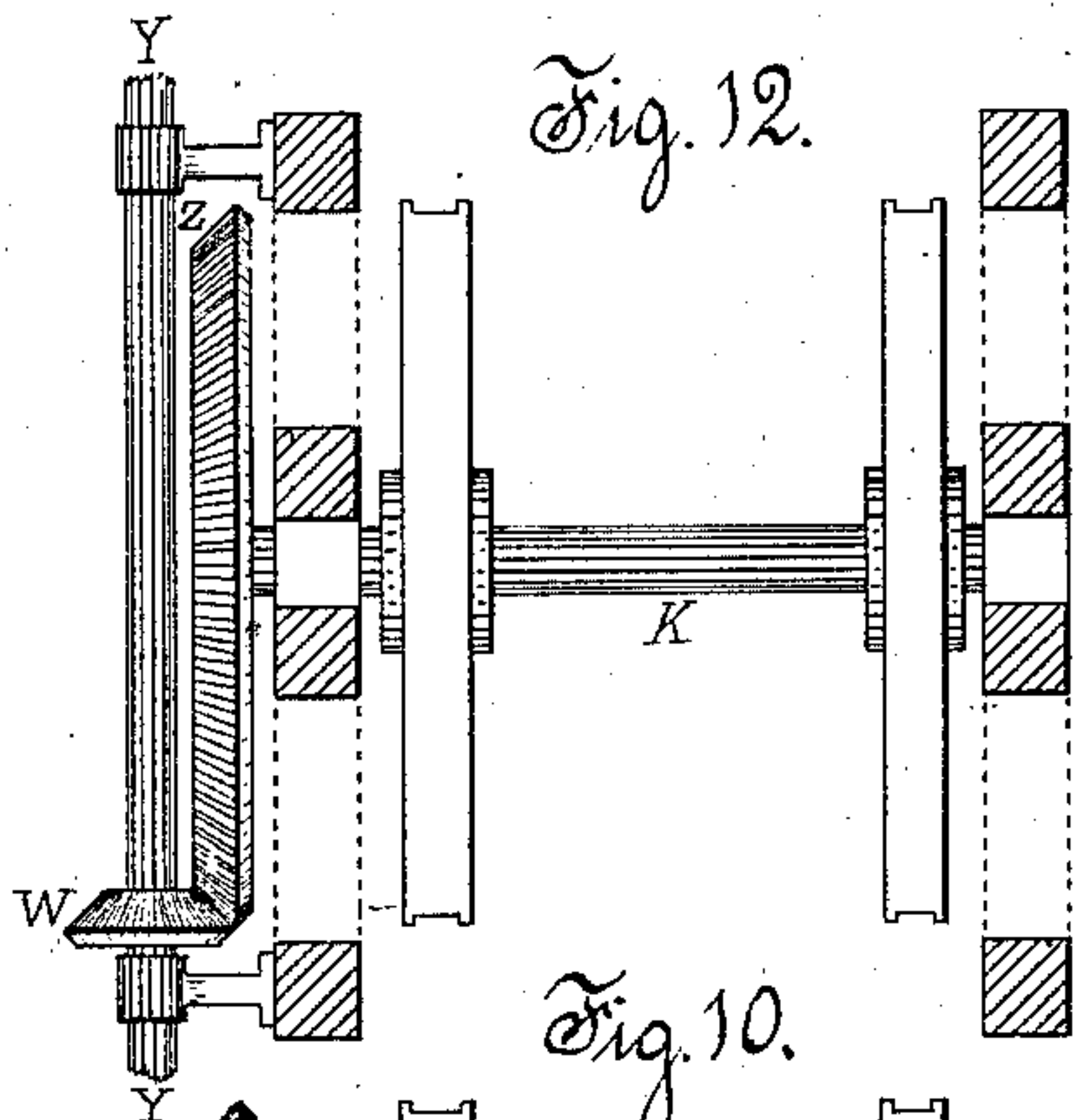


Fig. 10.

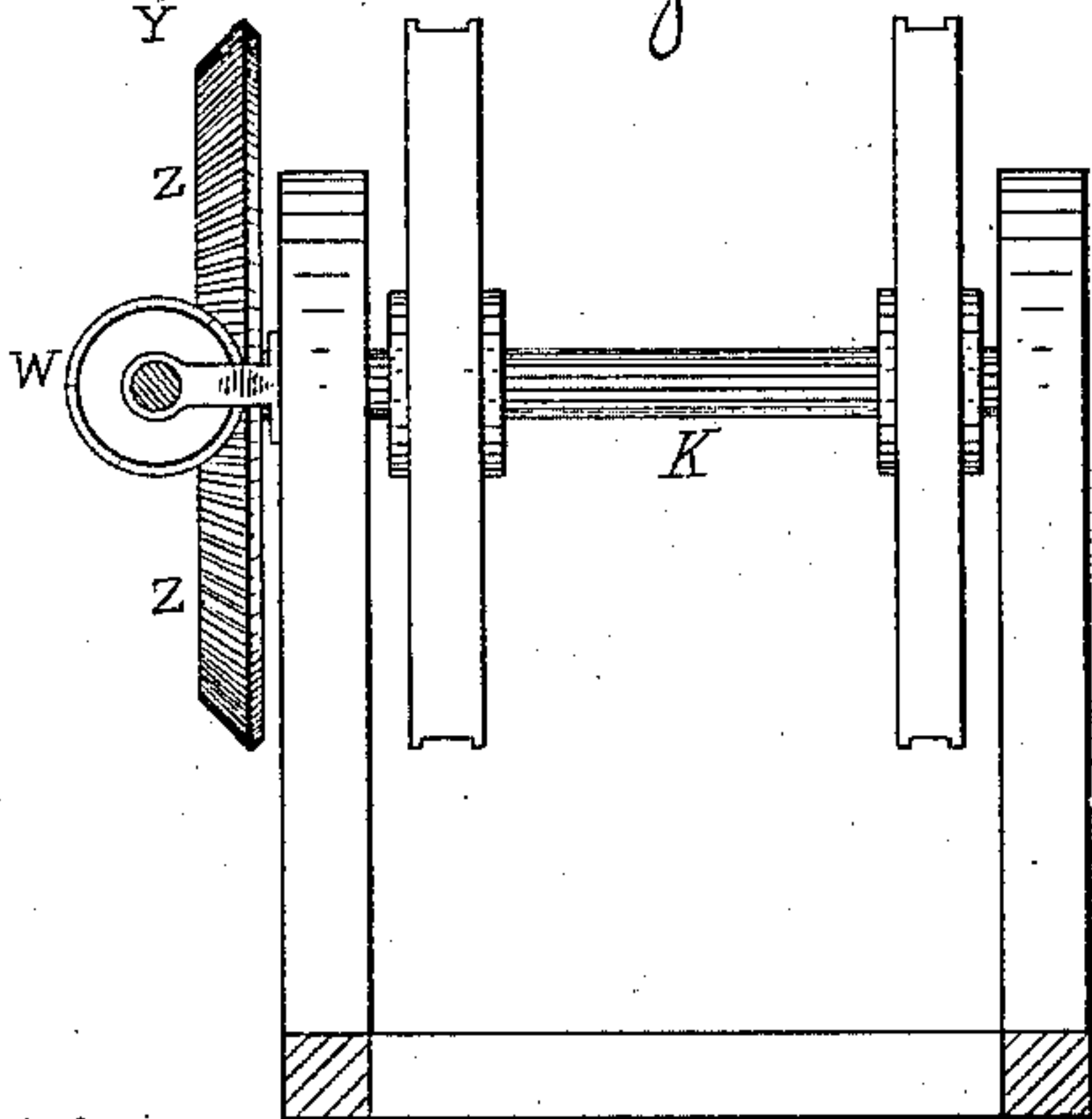
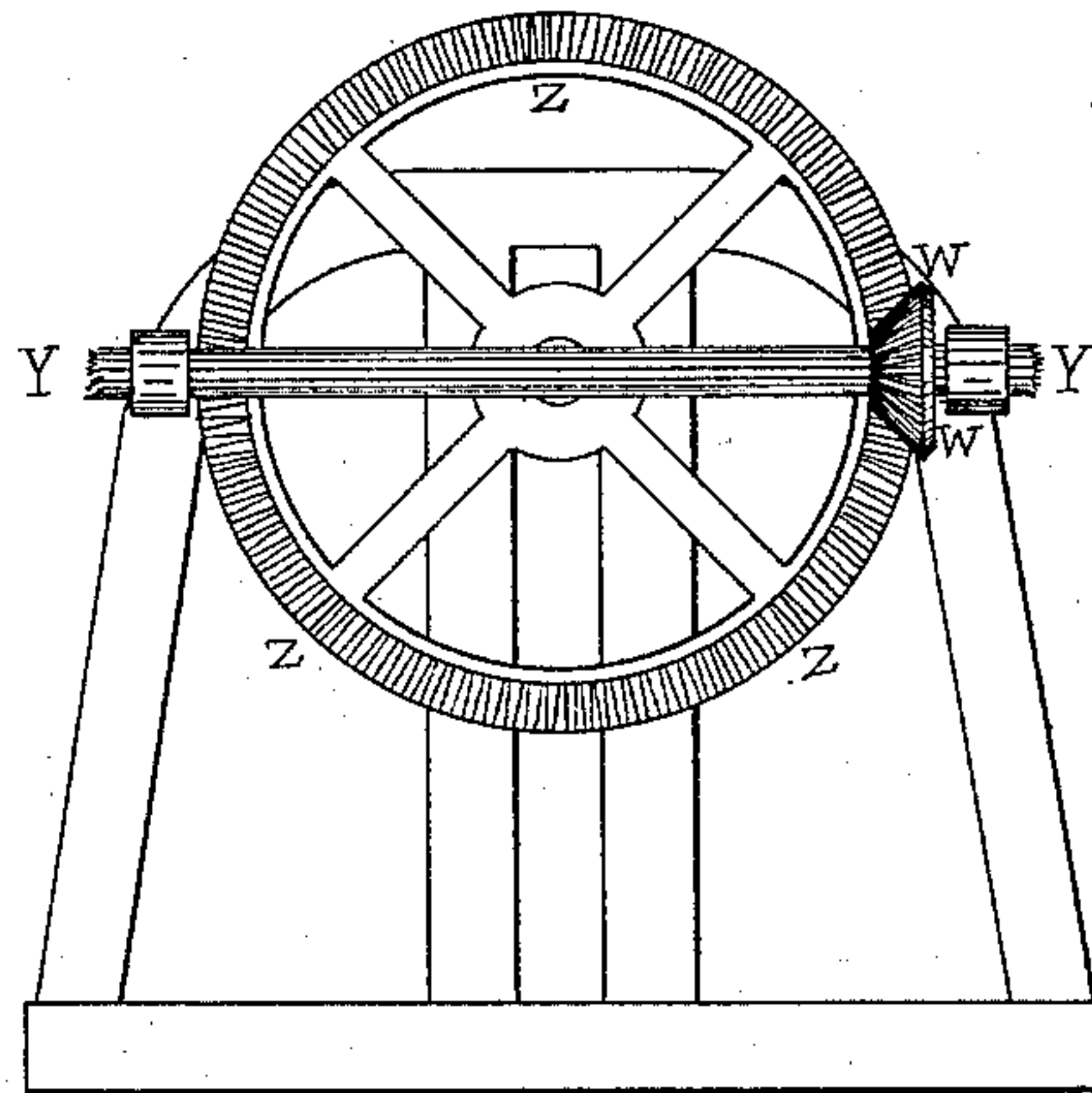


Fig. 11.



Witnesses:

Oliver N. Eaton  
Jacob R. Kelly

Inventor:

Oliver N. Eaton



# UNITED STATES PATENT OFFICE.

OLIVER N. EATON, OF NEW YORK, N. Y.

## ENDLESS HOD-ELEVATOR.

SPECIFICATION forming part of Letters Patent No. 287,013, dated October 23, 1883.

Application filed April 10, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, OLIVER N. EATON, of the city of New York, in the county and State of New York, have invented a novel and useful Endless Hod-Elevator and Driving-Gear, whereby an improved method of hod-elevating is introduced, and whereof a specification follows with reference to accompanying drawings, wherein similar letters indicate corresponding parts in the several views.

Among the difficulties common to the continuous system of hod-elevating by endless elevators now in use is the danger and damage occasioned by continuing the revolution and carrying the hod over the upper pulleys in the absence or inattention of the laborers whose duty it is to remove it. To obviate this difficulty and insure safety it has been customary to arrange an alarm or brake operated by the hod at a certain point in its ascent, and notifying or stopping the motive power. These safety devices, however, are themselves liable to damage and inaction, and require the endless band or ladder to be turned back to disengage the hod and permit its removal. To furnish an endless hod-elevator which by the improved method of hod-elevating employed shall itself answer all the requirements of safety and dispense with any special appliance for the purpose is one of the objects of my invention.

It is another of the objects of my invention to provide a new and improved hod-carrier, and by adaptations furnish a better endless hod-elevator than any heretofore used. I also show how rapid motive power may be applied by means of a peculiar combination of gears and sufficient decrease in revolutions obtained between the engine and the elevator without using an endless screw; and I further show how the motive power may be applied more advantageously and conveniently than ever before by means of a novel and useful combination of bevel-gears. When the hods are to be attached to the ascending side of the endless elevator, by seating or hooking them at their front end on a round or into a link, it is usual for laborers to do this from their shoulders. When the hod is to be seated on a round near its middle and the line of the center of gravity of its load, laborers usually have to reach such a position by first shank-

ing or standing the hod upon the ground or floor, or on a suitable platform erected in front of the elevator, and then pushing the hod toward the elevator until its bowl is in position over the carrier and is taken up by it as it ascends. Laborers prefer to put the hods on from the shoulder, and it is obviously preferable that the loaded hod should be supported in the line of its center of gravity as nearly as practicable. I attain these objects and safety at the same time by using an angular swinging bail as a carrier.

Figures 1 and 2 are respectively front and side elevations of such a hod-elevator constructed with endless wire ropes and having the angular swinging bails E, suspended in ears *c c* on ordinary clips around the ropes. The bail may have a tail-piece, *a*, with a jaw, *b*, adapted to embrace the hod shank or handle lower down, for additional support and security. When chains are used instead of ropes, the bails may be hung on the bolts or rivets of the links. In this elevator each hod derives its entire support from a single carrier independent of the others, and these may be affixed at such intervals as are found necessary to admit the hods and supply the demand. To insure safety and prevent damage in case of negligence in removing the hod at the upper station, I make the upper pulleys with separate shafts, B and C, independently journaled in suitable uprights, D D, on an ordinary base, and with sufficient space between their adjoining ends to allow the hod to swing through as it is carried over. If a hod is accidentally carried beyond its destination, no harm now results as it is carried over the top and down the other side, where it can be removed at any point of descent or returned to the bottom. The operation of seating a hod in this angular swinging bail is most clearly shown in Fig. 2, the dotted lines representing the hod upon a laborer's shoulder and the bail pulled toward him, for convenience. The ascending bail lifts the hod from his shoulder, and then it swings into the perpendicular position indicated by the full lines. The operation of removing the hod is similar. I propose to corrugate the sides of the hod-bowl in front of the middle for such space as may be practically necessary, (indicated by the dotted lines *d d* on the hod F in Fig. 2.) These corrugations may



be cut into the wooden sides of the bowl, or may be furnished by attaching a corrugated strip of metal. These corrugations correspond with the bail, which sinks into them and affords the hod a firmer seat. The use of the tail-piece *a* will obviate any necessity of these corrugations; or they may be used together for double assurance against accident. The bail *E* may be made elastic, so that the weight of the loaded hod shall cause the arms of the angle or *V* to bind against the sides of the bowl or into its corrugations. These corrugations may be continued, also, along the bottom of the bowl, to engage the carrier.

Figs. 5 and 6 show this method adapted to a single-chain endless elevator, and are respectively front and side elevations. The carrier *V* is here an angular bracket, having a claw, *g*, and suspended at suitable intervals by an eye, *h*, on a bolt or rivet on the side of the chain, which position utilizes the natural stiffness of the chain to prevent lateral sway. The upper pulley, *T*, is now placed at the end of its shaft *U*, to allow the hod to swing by when carried over, as shown most clearly in Fig. 6, which also shows how this claw-carrier catches and holds the hod.

Figs. 3 and 4, being respectively front and side elevations, show an endless-ladder elevator constructed of chains instead of wire ropes; but either chain or rope may be employed and the connections easily adapted in any ordinary manner by the mechanic. The connecting-rounds *R* have an ear or eye, *e e*, at each end, through which they are suspended by the bolt or rivet connecting the links, whereupon they swing easily and always maintain a proper position to receive the hod. The central part, *f*, of such connecting-round is of a *V* shape, the angle being suited to the angle of the hod-bowl and of any sufficient depth, two or three inches usually being enough. The practical operation of this peculiar construction is as follows: A hod is seated upon a round in the *V*, and its handle or shank swings inward against the next lower round, *R'*, and naturally finds its way into that *V* which, by the pressure, is more or less swung inward, and forms a notch, *f'*, by which the handle is held from all possible lateral sway. The hod is thus securely and simply seated for elevating, and is put on and taken off in the usual manner. The rounds, being suspended, always maintain the same upright position throughout the revolution.

Fig. 7 shows a novel carrier adapted to a single-chain elevator. This carrier is fixed, and consists of two *V*'s united at their points, forming an *X*. This is attached to the side of a link by a bracket or brackets, *m m*, sufficiently out from the chain to give room for the hod-bowl, and its outer arms are connected to form a handle, *K*, which a laborer can conveniently grasp, to surely guide the hod while on his shoulder to its seat upon the carrier. The carrier *X*, the link *n*, and their connections *m* and *k* are preferably cast to-

gether in one piece of malleable metal. The hod requires additional support from the next lower carrier, against which its shank rests in a suitable notch or between two pins, *i i*, which can be likewise cast in each carrier. Attaching the carrier and the hod carried to the side of the chain, instead of on its front, is novel and useful in that it utilizes the natural stiffness resulting from the construction of the chain to resist the tendency to sway or deviate from a right line of ascent caused by the loaded hods.

Figs. 3 and 4 also show a novel and useful combination of driving-gears, whereby the number of revolutions of the endless elevator, as compared with the number of revolutions of the engine, is sufficiently reduced to meet the requirements of actual use. The pulley *S* of the engine is connected by a belt or driving-chain, *Q*, with the loose pulley *P* on the shaft *K*. The pulley *P* and pinion *O* are fastened together, and both run loose on the shaft *K*. The pinion *O* meshes with the cog-wheel *N*, fast on the shaft *H*, which also has fast on it, toward the other end, the pinion *L*, meshing with the cog-wheel *M*, fast on the shaft *K*. The shafts *K* and *H* have bearings on any suitable frame-work. Fastened on this shaft *K*, also, are the lower pulleys, driving the endless elevator in the ordinary way. For example, suppose the diameters of the several wheels to be as follows: *O* equals ten inches, *N* equals eighteen inches, *L* equals four inches, *M* equals twenty-four inches, *S* equals six inches, and *P* equals twelve inches. If *S* runs at two hundred and fifty revolutions per minute, then *P* runs at one hundred and twenty-five, and its pinion *O* at the same number, while the cog-wheel *N* has only about seventy revolutions and the pinion *L* the same number. The cog-wheel *M*, meshing with the pinion *L*, therefore, has only about twelve revolutions per minute, and the driving-pulleys of the elevator the same number. If these driving-pulleys are six feet in circumference, the endless elevator ascends about seventy feet a minute, which is a practical speed. Other combinations can easily be made by any good mechanic to suit the circumstances.

With the driving-gear shown in Figs. 3 and 4, as with the driving-gears well known in the art, the motive power, whether man, horse, or engine, must be in line, either in front or back of the elevator, and in either place is in the way of laborers putting on or taking off hods. It is most desirable in use that the motive power should be at one side, and this has been accomplished by using an endless screw to transmit the power; but this is objectionable because of the great friction and consequent waste of power. I attain this object and avoid this objection by the use of bevel-gearing. Figs. 10, 11, and 12 show this motive gearing applied to the lower frame-work of an endless elevator, and Figs. 8 and 9 show its adaptation to the upper frame-work. Fig. 12 is a plan of the mechanism shown in front and



side elevation in Figs. 10 and 11, respectively. The shaft K, carrying the driving-pulleys of the elevator, has fast at one end the bevel-wheel Z, which is driven by the bevel-pinion W, fast on the shaft Y, having bearings suitably secured to the frame-work. To this shaft power is applied in the well-known ways. When the power is applied at the top, a slight modification in combining this bevel-gearing may be necessary in order to bring the driving-shaft down to a convenient height for manpower, and such modification is shown in Figs. 8 and 9. The bevel-wheel Z meshes with the bevel-pinion J, having a companion bevel-pinion, J', fastened at the opposite end of its shaft, which may vary in length according to requirements, and be journaled and secured upon the frame-work in any ordinary manner. This latter bevel-pinion, J', meshes with the bevel-pinion W upon the shaft Y, to which power may be applied, as before. Either style of motive gearing may be easily adapted by any skilled mechanic to driving the single chain or ladder elevator, either at the top or the bottom.

What I claim as new, useful, and my invention is—

1. As a hod-carrier, an angular swinging bail suspended between the parallel chains or ropes of an endless hod-elevator.

2. As a hod-carrier, an angular swinging bail having a tail-piece with arms to embrace the hod-handle, and suspended between the parallel chains or ropes of an endless hod-elevator.

3. As a hod-carrier, an angular swinging bail with or without a tail-piece for additional support, in combination with corrugations on the hod-bowl.

4. As a hod-carrier, an angular swinging bail or bracket suspended on one side of the single chain or rope of an endless hod-elevator, and having arms or claws suited to receive the handle and hold the bowl of a hod.

5. As a hod-carrier, an angular swinging bail or bracket suspended on one side of the single chain or rope of an endless hod-elevator to hold the hod-bowl, in combination with the next lower similar bail or bracket to hold the hod-handle.

6. As a hod-carrier, an X-shaped carrier attached to the side of the single chain or rope of an endless hod-elevator.

7. As a hod-carrier, an X-shaped carrier attached to the side of a link of the single chain of an endless hod-elevator.

8. As a hod-carrier, an X-shaped carrier attached to the side of the single chain or rope of an endless hod-elevator, and provided with a handle on the opposite side to guide the operator.

9. As a hod-carrier, the combination, in a single casting, of an X-shaped carrier, with a handle on one side and a link on the other, fitted to connect in the single chain of an endless hod-elevator.

10. As a hod-carrier, an X-shaped carrier

provided with a recess on its face to hold the hod-handle from lateral sway.

11. As a hod-carrier, a swinging V-shaped carrier with lateral arms extending between and suspended from or in the parallel chains or ropes of an endless hod-elevator.

12. As a hod-carrier, a swinging V-shaped carrier with lateral arms extending between and suspended from or in the parallel chains or ropes of an endless hod-elevator, in combination with the next lower similar hod-carrier, whereby the hod-handle is held from lateral sway.

13. As driving-gear for an endless hod-elevator, the loose pulley and pinion in the specified combination of gears for reducing speed.

14. As driving-gear for an endless hod-elevator, the specified combination of gearing for reducing speed.

15. As driving-gear for an endless hod-elevator, bevel-wheels whereby the motive power is placed at one side of the elevator.

16. As driving-gear for an endless hod-elevator, a bevel-pinion meshing with a bevel cog-wheel, their respective shafts at right angles to each other in the same horizontal plane.

17. As driving-gear for an endless hod-elevator, companion bevel-wheels at opposite ends of an independent shaft, to transmit motion in the specified combination of bevel-gearing.

18. As driving-gear for an endless hod-elevator at the top station, the specified combination of bevel-gearing, whereby motive power can be applied at a convenient height.

19. As upper pulley supporting an endless hod-elevator, such pulleys on independent shafts separated to allow the passage between of the suspended hod when carried over.

20. As upper pulleys supporting an endless hod-elevator, such pulley on the end of its shaft to allow the passage by of the suspended hod when carried over.

21. As an improved method of safely elevating hods, an endless hod-elevator, wherein the suspended hod may ride over the top.

22. As an improved hod for an endless hod-elevator, a hod with its bowl corrugated perpendicularly on its sides to engage corresponding sides of a hod-carrier.

23. As an improved hod for an endless hod-elevator, a hod with its bowl corrugated perpendicularly on its sides and horizontally on its bottom to engage a hod-carrier.

24. As an improved endless hod-elevator, a single chain carrying hods hung on its side, instead of its face, whereby its structural stiffness prevents sagging and swaying.

In testimony whereof I have hereunto signed my name this 5th day of April, A. D. 1883, in the presence of two subscribing witnesses.

OLIVER N. EATON.

Witnesses:

SIMEON FORD,  
JACOB RETTIG.