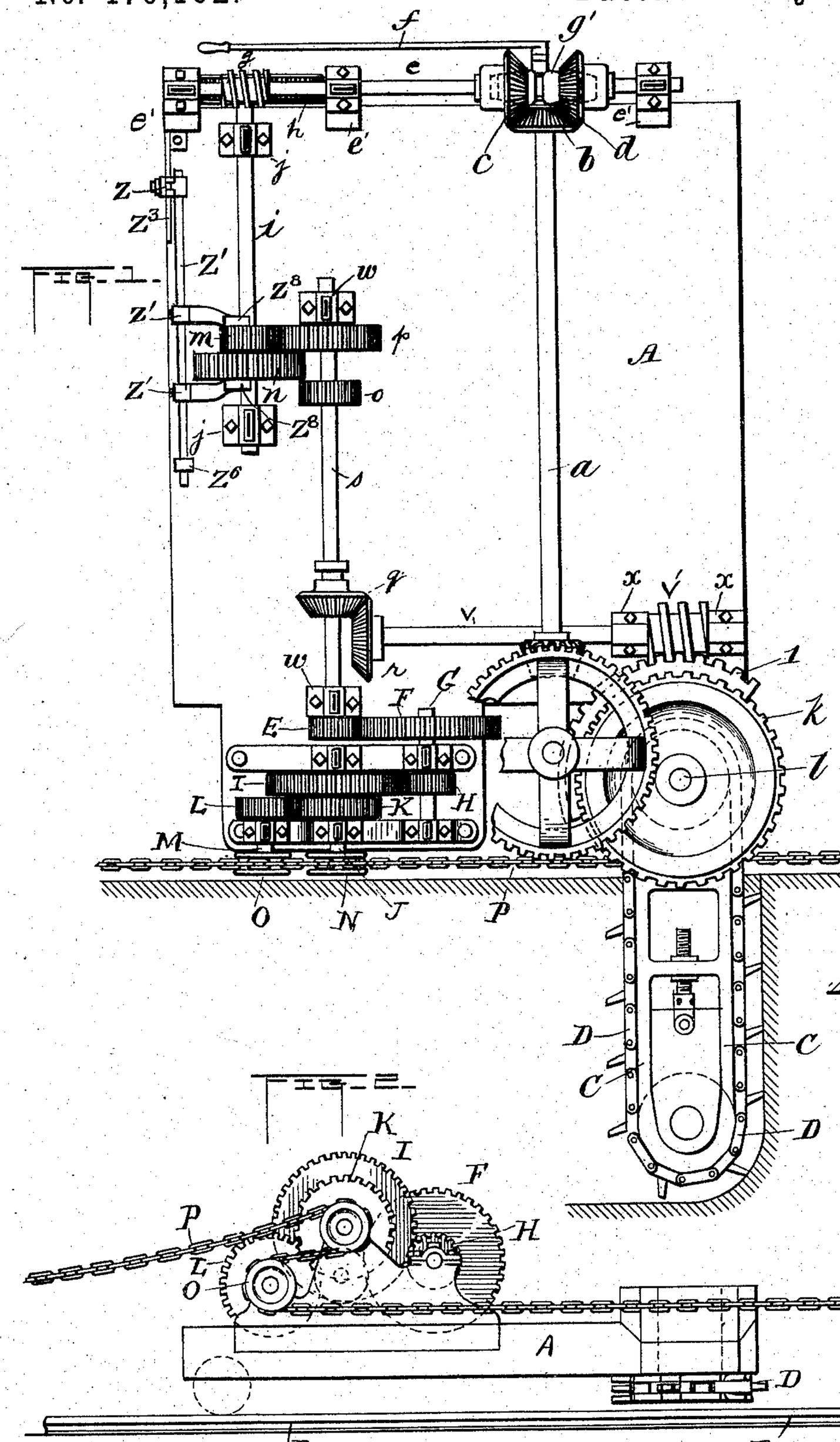
(No Model.) 2 Sheets—Sheet 1.

J. H. McEWEN.

COAL CUTTING MACHINE.

No. 476,162. Patented May 31, 1892.



Witnesses
Severance.
W. Harry Muzzy.

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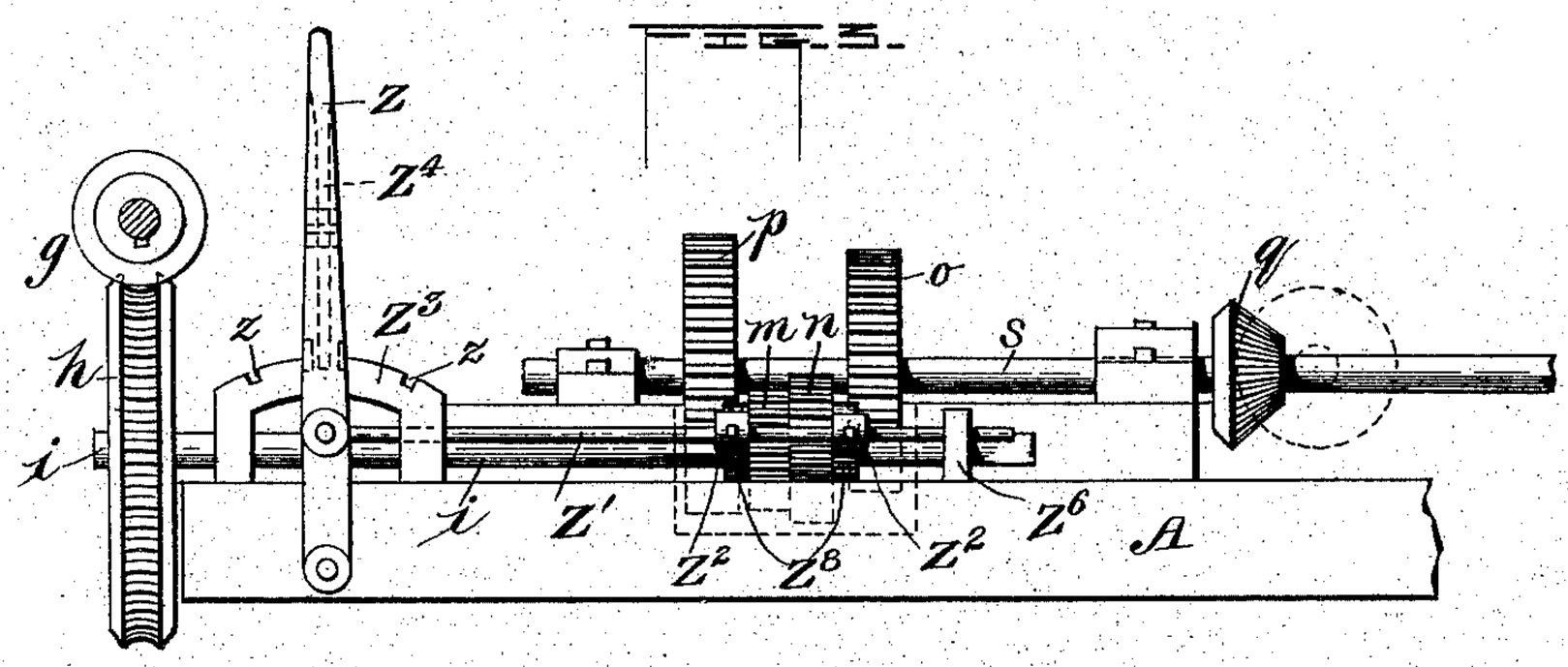

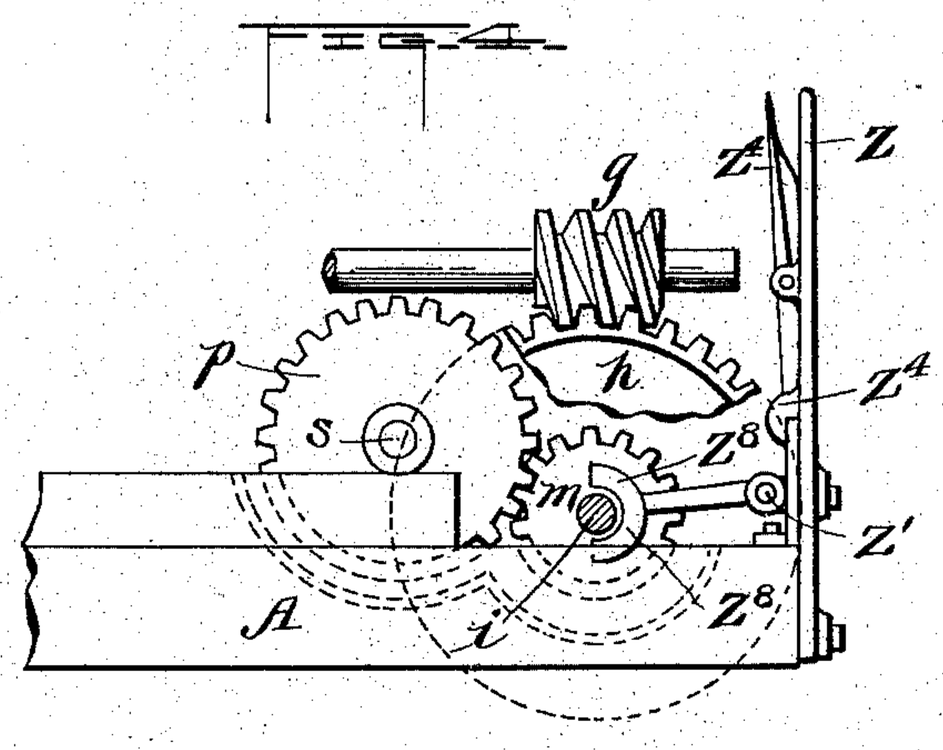

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UNITED STATES PATENT OFFICE.

JAMES H. McEWEN, OF RIDGWAY, PENNSYLVANIA.

COAL-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 476,162, dated May 31, 1892.

Application filed July 22, 1891. Serial No. 400,315. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. MCEWEN, a citizen of the United States, residing at Ridgway, in the county of Elk and State of Pennsylvania, have invented certain new and useful Improvements in Coal-Cutting Machines; and I 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 is an improvement on the mechanism set forth in my Letters Patent No. 450,971, April 21, 1891, and also on machines constructed for the same general purpose and fed along the material to be operated on by a chain attached at its front end to some fixed object and passing over pulleys on the said machine and driven by the motor-power thereof, so that the draft will be applied in line with the cutting-face of the machine.

The said invention consists in certain details of construction and combination hereinafter described for increasing its efficiency.

In the accompanying drawings, Figure 1 represents a plan view of a coal-cutting machine embodying my invention. Fig. 2 represents an elevation of the cutting side thereof, omitting certain parts which have nothing to do with the present improvement. Fig. 3 represents a side elevation of a part of the machine-frame and gearing, showing the shifting devices for changing the speed of cutting; and Fig. 4 represents a detail view of the shifting-lever with its attachments and proximate devices at right angles to Fig. 3.

A designates the frame or truck of the machine; B, a section or length of portable track consisting of two rails, on which the machine moves, and C designates the swinging arm which carries the cutter-carrying belt D, this arm being rigid with a sleeve surrounding the vertical driving-shaft *l* of the said belt. The upper end of this shaft is provided with a gear-wheel *k*, and the upper end of the said sleeve is provided with a worm-segment 1, both of which are driven through suitable gearing by the said motor-shaft *a*, as described in the aforesaid patent, to cause the inward and outward swinging motion of the cutter-carrying arm C and the continuous travel of the cutter-carrying belt D. The cutter-operating devices and the connecting-gearing are fully described in the said patent, and as they have for the most part no relation to the present improvement a reference to the said patent for such fuller description is deemed sufficient.

To allow the cutter-carrying arm to swing in either direction, as desired, the bevel-wheel *b* on the rear end of motor-shaft *a* is continuously in mesh with two reversely-facing bevel-wheels *c* and *d*, which are normally loose on their shaft *e*, at right angles to the said motor-shaft. A hand-lever *f* shifts a double-cone-shaped friction-clutch *g'*, splined on said shaft, into engagement with one or the other of the said bevel-wheels *c* and *d*, as desired, thus determining the direction of rotation of the said shaft *e*. The said bevel-wheels *c* and *d* are cone-recessed to receive the said clutch. This shaft *e* turns in standard-bearings *e'* on platform A and carries a worm *g*, which engages a worm-wheel *h* on a short shaft *i*, parallel to the motor-shaft *a*. This shaft turns in bearings *j* on the said platform, these being necessarily lower than bearings *e'*, in order that the said worm-wheel may turn under the said worm. Of course any other ordinary and suitable form of gearing may be substituted. This shaft *i* carries two gear-wheels *m* and *n* of different diameters, the larger one *n* being intended to mesh with a smaller gear-wheel *o* on a second short shaft *s*, arranged on a line parallel to shaft *i*, this engagement taking place when one of the shafts *i* or *s* is shifted endwise from the position of Fig. 1 to allow such engagement.

Fig. 1 shows the smaller gear-wheel *m* of shaft *i* in mesh with an equal gear-wheel *p* of shaft *s*. By this well-known method of varying the speed of a driven shaft I am enabled to regulate the swinging motion of the cutter-arm. A bevel gear-wheel *q* on the shaft *s* engages a similar wheel *r* on a shaft *v*, arranged transversely to the motor-shaft. This shaft *v* carries a worm *v'*, which engages and drives the worm-segment 1. The shafts *s* and *v* turn, respectively, in bearings *w* and *x* on the frame or platform A. The shifting of shaft *i* is preferably effected by a shifting-lever Z, (shown in Figs. 1, 3, and 4,) which is pivoted to the side of frame or truck A and has also pivotal connection with an endwise-movable rod

or shaft Z′, the latter being parallel to the said shaft *i* and provided with arms Z^2, having at their ends curved bars Z^8, arranged one on each side of the pair of gears *m n* aforesaid, so that the two shafts will necessarily move together in either direction. This shaft Z′ moves through a guide Z^6 on the said truck or frame. The said shifting-lever Z is provided with a spring-catch Z^4, of ordinary construction, arranged and adapted to engage the notches *z* of a locking segment-rack fixed on the said truck.

The end of the shaft *s* nearest the cutting-face of the machine is provided with a cog-wheel or pinion E, engaging a gear-wheel F on a short shaft G, carrying a pinion H, which meshes with a gear-wheel I on a short shaft J, carrying, also, another gear-wheel K. This meshes with a gear-wheel L on a short shaft M, all of the shafts aforesaid being mounted in bearings or supports on the frame of the machine. The said train of gearing E H F I K L is for the purpose of turning in opposite directions two pulleys or peripherally-grooved wheels N and O, mounted, respectively, on the outer ends of shafts J and M over the edge of the frame A at the cutting-face or front of the machine. These pulleys are in the same vertical longitudinal plane; but the forward pulley N is higher in position than the rearward pulley O, so that they are obliquely arranged with respect to each other, as shown in Fig. 2.

P designates the drive-chain, which is attached at its forward end to a stake Q or other fixed object in line with the cutting-face of the machine or a very little in front thereof. The said chain extends backward from the said point of attachment under and partly around the pulley O, then obliquely forward and partly around the pulley N, and backward over the same. The rear end of the said chain may be attached to any object or left free, as shown.

The operation of the devices above described is as follows: The pulleys N O, being rotated, as described, by the motor-shaft *a* and intermediate gearing, bind upon the chain P, their position with regard to each other insuring a strong frictional hold thereon, and the machine in consequence is drawn straight forward with the same practical effect as though the motor were located at the point where the forward end of the chain is attached and the power is applied, the rear end of the chain in that case being supposed to be attached to the frame of the machine. The draft is therefore directly in line with the cutting-face of the machine and the leverage of the cutting-arm while doing its work and resisted by the coal will be much less than if the power were applied in line with the middle of the frame. The strain on the motor and its attachments will be correspondingly lessened. The tendency to twist sidewise from the track or to injure any of the gear-wheels, shafts, or other parts of the machine by the torsion due to the resistance of the coal is resisted by the chain P and the stake Q or other fixed object to which the said chain is attached. No such evil effect can follow until the said chain or the object to which it is attached is broken.

Instead of a chain a stout cable may of course be used, and I do not by any means confine myself to the arrangement of pulleys shown or to gearing for driving them. I have merely illustrated and described one means of embodying and applying my invention.

The chain and pulleys would of course be serviceable as means of propulsion for the machine if arranged in line with the middle of it or in line with any other part than the cutting-face. I have shown by far the best arrangement and combination of these parts, but do not wish to be understood as relinquishing any claim to them if applied out of line with the cutting-face.

It is possible to operate the machine by dispensing with one of the pulleys and winding the chain entirely around the other; but in practice this is found to be far less satisfactory than the arrangement and use of two pulleys shown and described.

The pulleys may of course be increased in number for increase of friction and grasp of the chain.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

In a coal-cutting machine, the chain P and a fixed device Q, to which one end of the said chain is secured, in combination with the pulleys N O, which are arranged obliquely with respect to each other in the same vertical plane and have the said chain passed around them in opposite directions, the shafts of the said pulleys, the intermeshing gear-wheels K L of the said shafts, the gear-wheel I on the shaft of wheel K, the pinion H, meshing therewith, the gear-wheel F on the shaft of pinion H, the motor-shaft of the machine, the frame and running-wheels of the said machine, and suitable gearing from the motor-shaft to the said wheel F, whereby the rotation of the said shaft is transmitted to the pulleys N O and the frictional contact of these pulleys with the chain causes the machine to advance along its track, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES H. McEWEN.

Witnesses:
R. A. CARTWRIGHT,
JNO. W. HALL.