

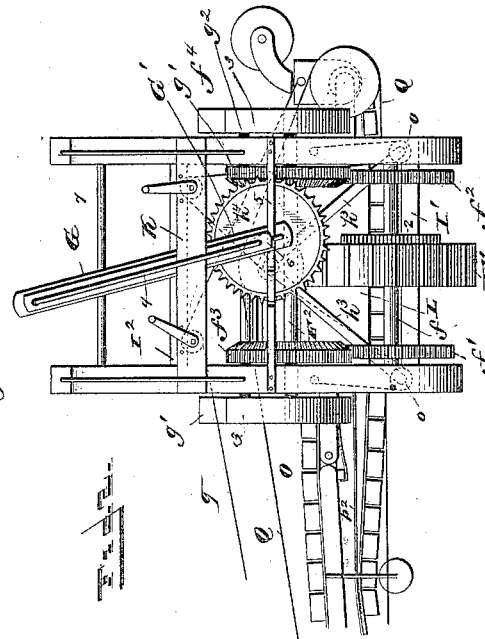
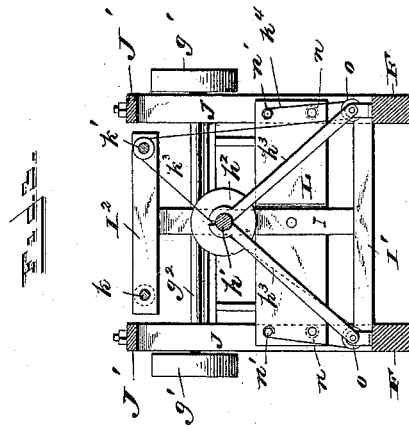
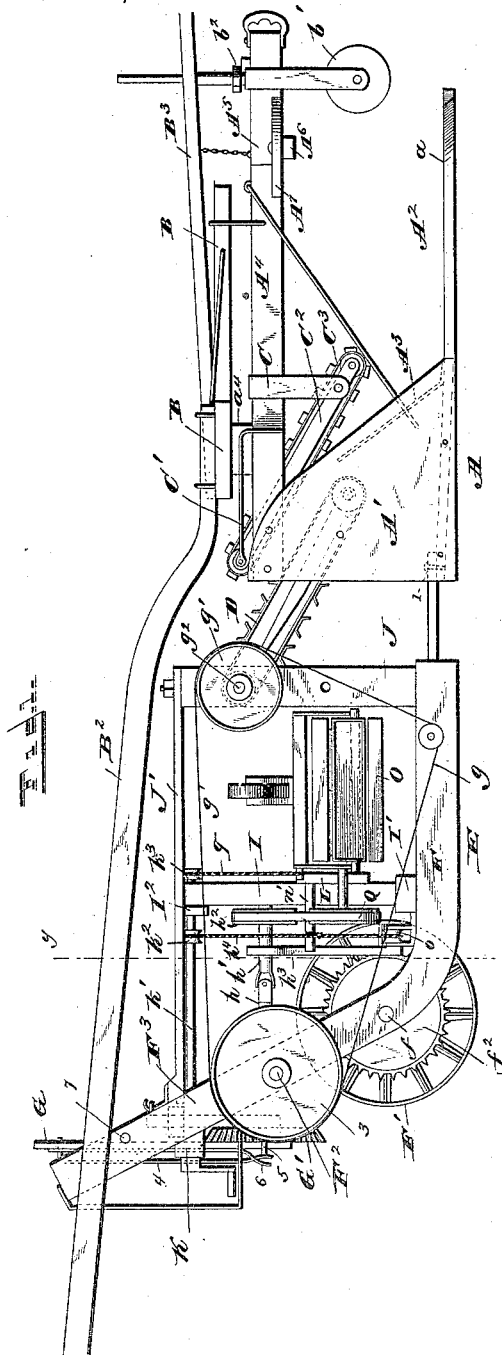
(No Model.)

4 Sheets—Sheet 1.

H. KELLEY.
DITCHING MACHINE.

No. 423,329.

Patented Mar. 11, 1890.



Witnesses

G. S. Elliott.
W. Johnson.

Harvey Kelley
Inventor

By *his* Attorney

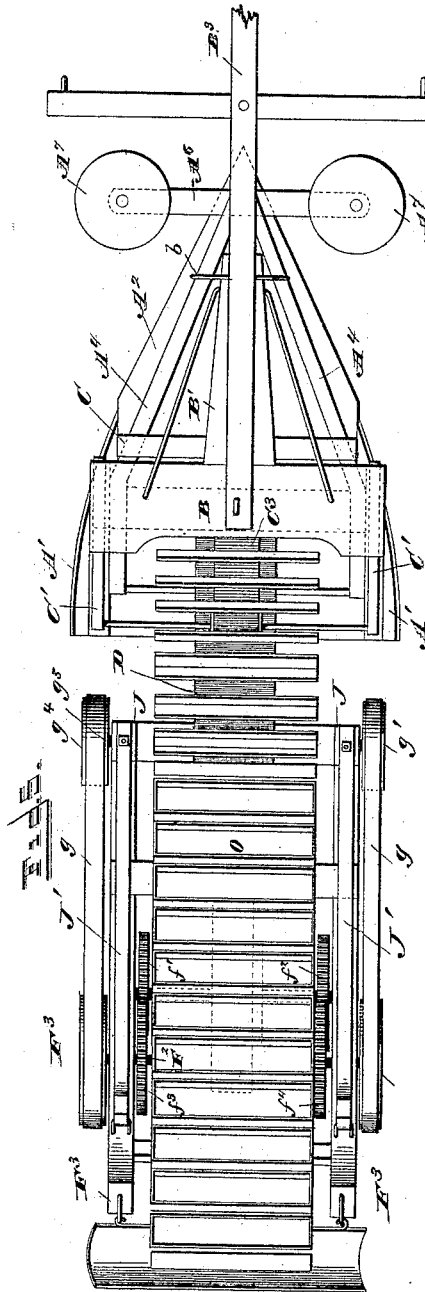
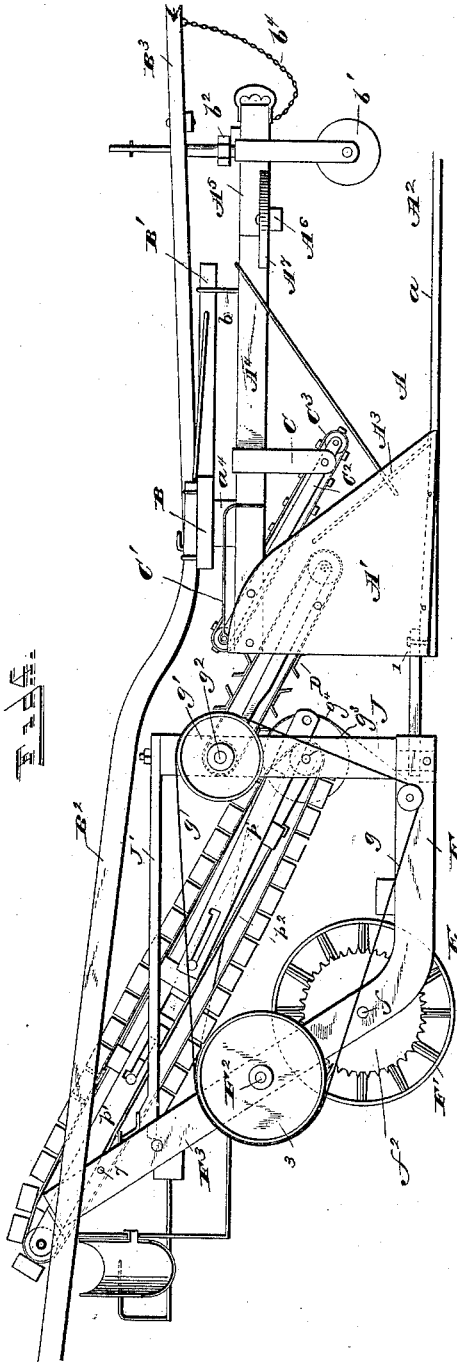
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Witnesses

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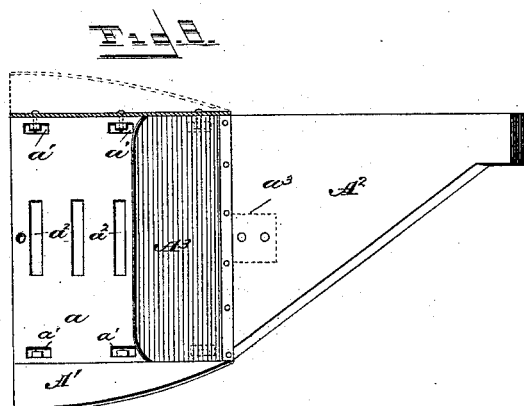
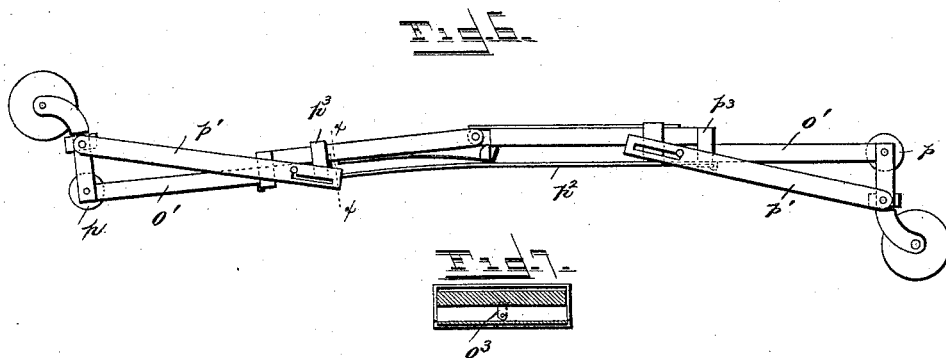
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INVENTOR

by

Attorney

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Fig. 9.

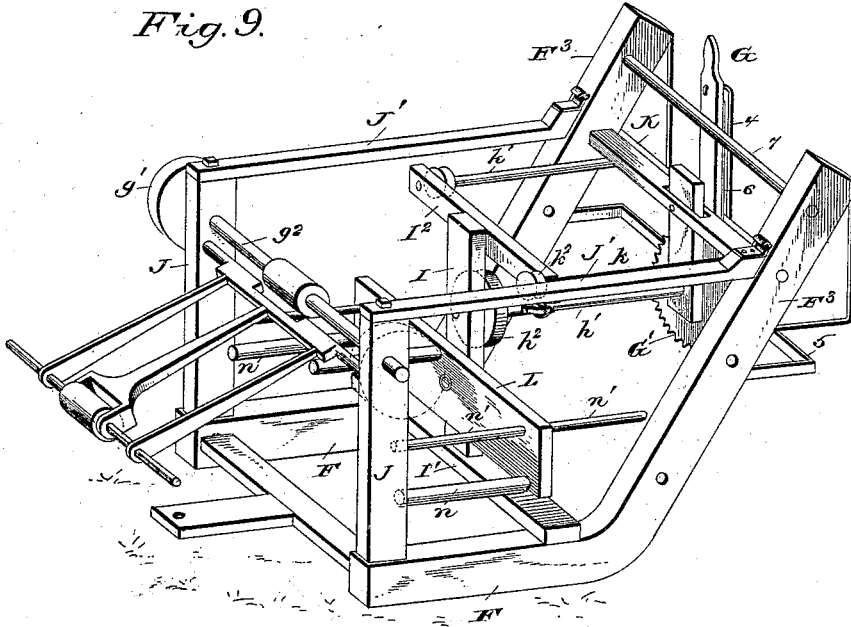
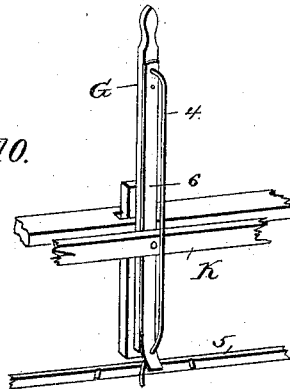


Fig. 10.



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UNITED STATES PATENT OFFICE.

HARVEY KELLEY, OF CUBA, NEW YORK.

DITCHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 423,329, dated March 11, 1890.

Application filed March 23, 1889. Serial No. 305,098. (No model.)

To all whom it may concern:

Be it known that I, HARVEY KELLEY, a citizen of the United States of America, residing at Cuba, in the county of Allegany and State of New York, have invented certain new and useful Improvements in Ditching-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, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My invention relates to certain new and useful improvements in ditching-machines, the object being to provide a machine or apparatus which can be employed for making either open or tile ditches; and my invention consists in the special construction, arrangement, and combination of the parts, as will be hereinafter fully set forth and claimed.

In the accompanying drawings, Figure 1 is a side view of my improved ditching-machine, showing the parts in position to dig an open ditch. Fig. 2 is a rear elevation. Fig. 3 is a sectional view taken through the line *yy* of Fig. 1. Fig. 4 is a side view of a modification, showing the apparatus arranged to dig a tile ditch. Fig. 5 is a plan view of the construction shown in Fig. 4, with parts removed. Fig. 6 is a detail view of the frame for carrying the endless conveying-belt. Fig. 7 is a sectional view taken through the line *xx* of Fig. 6. Fig. 8 is a plan view of the shovel. Fig. 9 is a detail perspective view of a portion of the rear frame, parts being removed; and Fig. 10 is a detail view showing the arrangement of rear operating-lever.

A refers to the front frame of the apparatus, which is provided with a shovel-board *a*, having openings *a'* near its side edges, in which nuts are located for rigidly securing the bolts connecting the side pieces *A'*. The shovel-board is also provided with openings *a''*, through which the dirt collecting thereon may pass. The shovel-board may be made in two sections to permit of different styles of points *A''* to be attached, the points being secured in place by providing the rear section with a tongue *a'''* which fits in a socket formed in the point *A''* and is secured therein.

To the front part of the rear section of the shovel-board is rigidly attached a rearwardly-inclined board *A''*, extending the entire width of the frame and further secured to the side pieces *A'*. To near the upper edges of the inclined side pieces *A'* are rigidly secured the rear ends of forwardly-converging beams *A''*, the forward ends thereof being attached to a central beam provided with a suitable clevis. The center beam and the converging beams near their rear ends are braced by a transverse strip *a''*, above which is pivoted a board or platform *B*, which has a forwardly-projecting arm *B'*, the end thereof passing beneath a bail or loop which limits its movement. Handle-bars *B''* are also secured to this pivoted platform, and by moving these handles the tongue secured to the frame can be operated to change the direction of the apparatus.

To near the front end of the central beam *A''* is attached a guide-roller *b'*, which can be adjusted vertically to regulate the depth of the cut by means of a nut *b''* and a block placed either above or below the beam. The upper part of the frame supporting the roller *b'* has a projecting rod, over which passes a beam *B''*, the rear end thereof being pivoted above the platform *B*, and to the forward end of this beam *B''* is attached a singletree. The beam or pole *B''* and the central beam *A''* are connected by a chain *b'''*, the length of which can be varied to suit the line of draft.

To the central beam, immediately in front of the converging beams *A''*, is secured a cross-beam *A'''*, upon the ends of which are mounted rollers *A''''*, adapted to bear against the sides of the ditch when the same has been dug to a sufficient depth and to keep the front part of the machine steady.

C and C' refer, respectively, to depending and spring bars secured to the front frame of the apparatus, the depending bars having a horizontal portion extending across the beams *A''* and *A'''*, and said depending bars supporting the front end of the inclined frame *C''*, while the rear end thereof is supported by the spring-bars *C'*, and in this frame are mounted rollers over which an endless belt passes, carrying transverse slats, which assist the dirt up the incline and upon the endless carrying-belt *D*.

The belt *C''*, hereinbefore described, is ro-

tated by the dirt passing upon the incline, while the belt D is operated by a suitable belt, as will be hereinafter set forth.

The shovel-board *a*, hereinbefore referred to, is provided centrally with an opening for the reception of a bolt or coupling-pin I, Figs. 1 and 4, by means of which the front section is pivotally connected to the main portion of the apparatus, and the inclined side pieces A' are provided with suitable bearings for the front roller, over which the conveying-belt D passes.

The rear frame is composed of the horizontal beams F, bent to provide the rearwardly-inclined beams F³, vertical beams J, and connecting-beams J'. In the beams F³ is journaled a shaft, upon which a driving-wheel F' is loosely mounted, said shaft having rigidly keyed thereon a ratchet-wheel 2, with which a pawl carried by the driving-wheel engages. The horizontal shaft *f* has also rigidly keyed thereto cog-wheels *f*² and *f*³, which engage with cog-wheels *f*³ and *f*⁴, which are mounted on the shaft F², said shaft carrying outside of the frame drive-pulleys 3, over which belts *g* pass for operating the pulleys *g*', mounted on the outer ends of a shaft *g*², which shaft is supported by the up-rights J, attached to the forward part of the rear frame, and carries pulleys over which the endless carrier-belt D passes. To the rear of the frame E is rigidly secured a cross-piece, to which is pivoted an arm G, the lower end of which carries a shaft *h*, having at its forward end a universal joint, while near its rear end this shaft is provided with a beveled wheel G', which can be thrown to either one side of the machine or the other, to engage with the cog-wheels *f*³ or *f*⁴, as may be desired, according to the direction in which the shaft *h*', carrying the driving-pulley *h*², is to be turned. The teeth upon the cog-wheels G' and *f*³ and *f*⁴ are constructed so that they will properly mesh when thrown in engagement. The arm G is secured at the limit of its throw in either direction by means of a flexible pawl 4, the lower end of which is bent to engage one of the series of notches in the bar 5, the said pawl being normally held in engagement with a spring-bar 6, through the lower end of which it passes.

I refers to a vertical standard supported above the transverse beam I', secured to the side pieces F of the rear frame, and in this vertical standard is journaled the front end of the shaft *h*', while the other end is suitably supported by brace-bars *h*³. To the upper end of the standard I is secured a cross-piece I², in the ends of which are journaled shafts *k* and *k*', the rear ends of which pass through the cross-piece K, where they are provided with crank-handles for operating the same. These shafts *k*' and *k* are provided with pulleys *k*² and *k*³, over which pass belts or cords, the use of which will be hereinafter set forth.

I refers to a cross-piece pivotally attached

to the standard I and a slight distance above the cross-beam I', and this cross-piece I is provided with forwardly-projecting anti-friction rollers, and between these rollers the conveyer-frame shown in Fig. 6 is placed. This cross-piece I is also provided at its upper corners with pins *n*', (see Fig. 3,) which pass through the same, their front portions extending over the frame shown in Fig. 6, while their rear ends project in rear of said cross-piece. The ends of a cord or belt *k*⁴ are attached thereto, and this cord or belt passes around the pulleys *o o* and extends from thence over a pulley K³. Thus, by turning the shaft *k*', one end of the cross-piece carrying the conveyer-frame is raised, while the other end is lowered, thus tilting the said conveyer-frame and its belt O. The said frame carrying the belt O is made of sections longitudinally extensible, the end sections O' carrying pulleys *p*, over which the endless conveying-belt carrying buckets passes. These end sections also carry caster-wheels, attached thereto by links and brace-bars *p*', so that said caster-wheels can be turned, one of said caster-wheels adapted to be elevated when the other contacts with the ground. The extension-bar carrying the endless conveying-belt is provided with a flat plate *p*², which is rigidly attached to one end of the section and passes under loops *p*³, attached to the inner ends of the sections O', and the inner ends of the center sections are pivoted to each other. These sections, when extended, can be locked by means of turn-buttons *o*³, and the brace-bars *p*' are adapted to hold the caster-wheels in a vertical position when they are either raised or lowered. The endless conveying-belt O is provided with a series of buckets, and sections may be added to this belt, so that it can be given the desired length. The frame carrying this belt O is provided at its ends with pulleys *p*, over which the conveying-belt passes, the journal of one of the said pulleys *p* being extended for the attachment of a pulley, over which a belt Q passes for operating said endless carrying-belt. The belt Q is driven by the pulley *h*², mounted on the shaft *h*', and it is provided with means for lengthening and shortening the same. Over and around the pulley *k*² on the shaft *k* passes a cord *q*, which engages with pins attached to the ends of the conveying-frame, and by turning said shaft the frame upon which is mounted the conveying-belt O may be shifted to the right or left of the apparatus as the cord exerts traction on one end and is paid out to the other.

In operation the earth, which is raised by the point A², is caused to pass upward over the incline A³ and onto the endless conveying-belt D, driven by the pulley *g*', over which the belt *g* passes, and from this belt D it falls into the buckets attached to the endless belt O, and is conveyed to one side of the ditch and deposited. It will be observed that by moving the lever G to the right or left the

proper direction will be given to the carrying-belt O, while the movement of the other part of the apparatus is not varied.

The front standards J J, brace-bars J', cross-piece L, beam I', guide-pulleys o, shifting-lever G, gear-wheel G', and cross-piece I² are removably attached to the rear frame, they being either bolted or otherwise attached to the frame, and when removed the frame shown in Fig. 6 may be attached, so as to carry the earth from the belt D upwardly and rearwardly instead of laterally, this frame being pivoted at its forward end between the standards J upon a suitable shaft, while the upper end rests on a shaft 7, mounted in the inclined beams F³ of the apparatus. The driving-belt g will then rotate pulley g⁴ and the endless belt O and convey the dirt upwardly into a chute, which may be suspended in an inclined position at the rear of the frame. It will be thus observed that the same frame and endless belt can be used in two positions.

When the parts are arranged in the position shown in Figs. 4 and 5, one of the journals of the conveyer-frame is suitably provided with a band-pulley, which can be geared to any other moving part of the machine, and thus communicate motion to the belt O, carried by the frame.

The ditch can be dug to any depth required by passing the apparatus backward and forward.

I claim—

1. The combination, in a ditching-machine, of a plow consisting of a shovel-board a, incline A³, and an endless belt mounted on spring-supports, said belt being inclined and located above the incline A³, substantially as shown.

2. The combination, in a ditching-machine, of a frame A, having a draft-beam, a transverse beam secured thereto, and provided at its ends with rollers A⁶, substantially as shown.

3. The combination, in a ditching-machine constructed substantially as shown, of a front frame A, having a rigid central beam A⁵ and converging beams A⁴ secured thereto, a support or platform having a transverse board, to which are secured handle-bars and a projecting arm, the handles and arm being adapted to swing upon a pivot, and a loop b for limiting the movement thereof, substantially as shown.

4. The combination, in a ditching-machine, of a front frame, to which the draft mechanism is attached, an inclined mold-board A³, rigidly secured between the inclined side pieces A', a belt provided with transverse strips, said belt being mounted on a spring-supported frame, an endless belt D, provided with buckets, said belt being mounted upon a shaft carried by the rear frame and upon a

shaft journaled between the inclined side pieces A', the rear frame having a driving-wheel and mechanism for operating an endless conveying-belt, upon which the earth is deposited from the belt D, substantially as shown, and for the purpose set forth.

5. In a ditching-machine having the front and rear frames connected as described, said rear frame being provided with a driving-wheel, the conveyer-frame pivotally supported on the rear frame, shafts provided with flexible connections for tilting the conveyer-frame, and a belt on the latter frame, substantially as set forth.

6. The combination, with a ditching-machine, of a conveyer-frame made up of central and end sections, the end sections being extensible and provided with rollers over which the endless carrying-belt passes, and caster-wheels secured to said end sections so they can be reversed, substantially as shown, and for the purpose set forth.

7. In a ditching-machine, a conveyer-frame carrying guide-rollers and caster-wheels, in combination with the pivoted support therefor, as L, and pulleys k³ and k² and cords q and k⁴, respectively, by means of which the frame can be tilted and moved laterally, substantially as set forth.

8. The combination, in a ditching-machine, of a conveyer-frame for removing the earth to one side of the apparatus, said conveying-belt being supported upon a pivoted frame, the frame upon which the endless belt is mounted having a flexible connection g, which is passed over a shaft, whereby when said shaft is turned the endless frame can be moved from one side of the apparatus to the other, the gearing provided with shifting mechanism, whereby the direction of the rotation of the conveying-belt can be varied, substantially as shown, and for the purpose set forth.

9. The combination, in a ditching-machine constructed substantially as shown, of a horizontal shaft mounted in the rear part of the frame and provided with a driving-wheel, said shaft also carrying cog-wheels, which mesh with cog-wheels mounted upon a shaft above the same, a gear-wheel carried by a flexible shaft, and provided with a lever G for shifting the end of the shaft, so that said gear-wheel can be thrown into engagement with either of the gear-wheels f³ or f⁴, so that the direction of the rotation of the shaft h may be varied, substantially as and for the purpose set forth.

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

HARVEY KELLEY.

Witnesses:

J. C. LEGGETT,
J. CHALKES.