(No Model.) 2 Sheets—Sheet 1.

W. WILSON.

DITCHING AND TILE LAYING MACHINE.

No. 254,083. Patented Feb. 21, 1882.

Fig. 5.

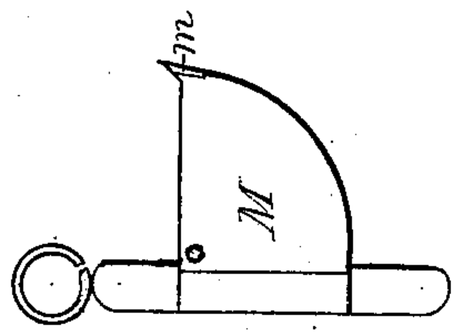

Fig. 4.

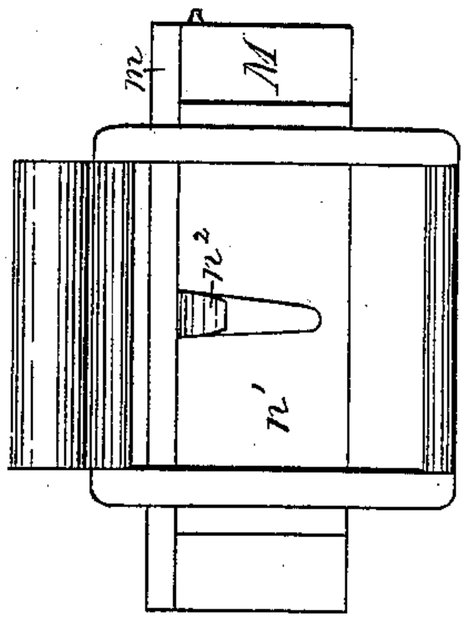

Fig. 1.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

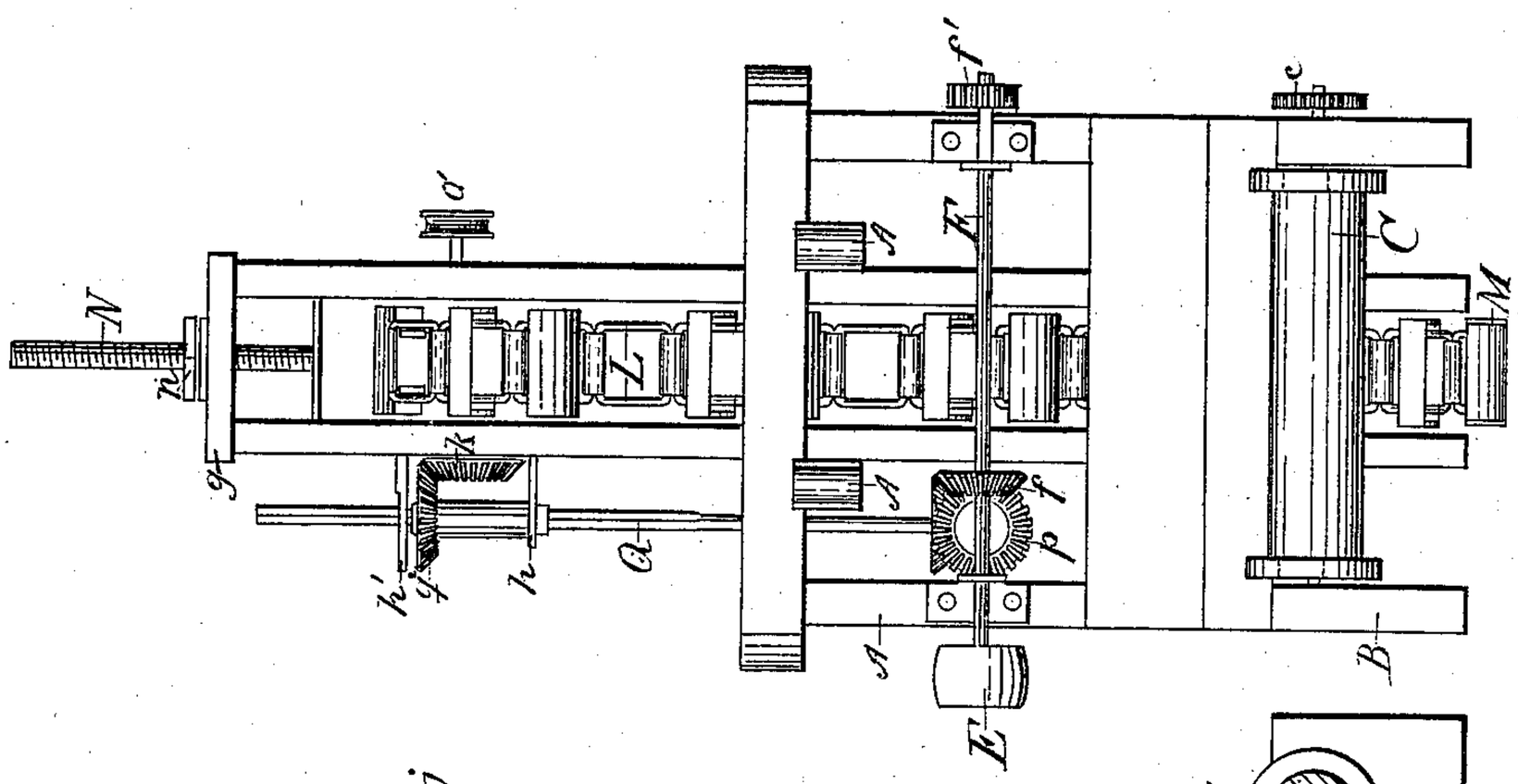

Fig. 6.

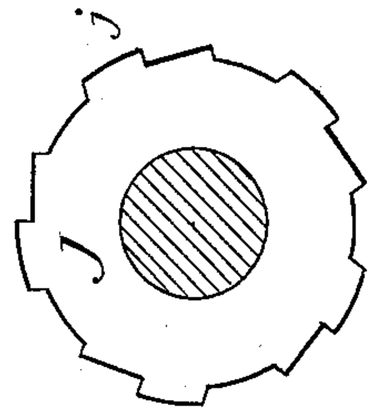

Fig. 3.

Witnesses

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UNITED STATES PATENT OFFICE.

WILLIAM WILSON, OF EARLVILLE, ILLINOIS.

DITCHING AND TILE-LAYING MACHINE.

SPECIFICATION forming part of Letters Patent No. 254,083, dated February 21, 1882.

Application filed May 24, 1880. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM WILSON, of Earlville, county of La Salle, and State of Illinois, have invented a new and useful Improvement in Ditching and Tile-Laying Machines, of which the following is a full, clear, and exact description.

In the accompanying drawings, Figure 1 represents a side view of a machine embodying my invention. Fig. 2 represents a front view of the same; Fig. 3, a sectional view taken on a plane parallel to the side of the same. Fig. 4 is a rear view of the bucket used, and Fig. 5 a side view of the same; Fig. 6, an enlarged view of the sprocket-wheel.

The object of my invention is to provide by improved details of construction an efficient machine which shall carry its motive power and rapidly excavate a ditch to the required depth, and, if desired, shall at the same time fill in the ditch with the previously-removed earth after tiles have been placed in the excavation.

My invention consists in details of construction, hereinafter fully explained and specifically claimed. It is mainly an improvement on a machine having a vertically-adjustable frame carrying an endless belt and sprockets adapted to be drawn along on runners. It is also adapted to carry an engine to furnish its own motive power.

In the drawings, A represents the frame, which is mounted on the sliding runners B, one upon each side. These runners are connected in front by the roller C, to which is attached one end of a cable, the other end being attached to any suitable anchor some distance in front of the machine, so that by the revolution of the roller the cable is wound thereon and the entire machine consequently drawn forward, the sliding runners B slipping along the ground. Just back of the roller C is the platform D, running across the machine between the runners B. Upon this platform is placed a stationary engine, which is connected by belting to the pulley E, which is rigidly attached to the horizontal shaft F, which is attached by suitable supports to the elevated portion of the frame.

The frame A is provided with a perpendicular framed shaft or standard, G, the sides of which are united at the top by the horizontal plank or plate *g*. Through the sides of the standard G are cut the perpendicular slots *g'*, extending the whole length of the standard.

Fitted within the standard G is the interior frame, H, which is provided at its sides with projecting bars, which fit in the slots *g'*, so as to permit the frame H to slide freely up and down within the standard G.

Within the frame H, at its lower end, is pivoted the pulley I, and at its upper end are pivoted the sprocket-wheels J and K. The wheel J is placed lower than K, and gives a downward slope to the belt at that point, assisting in discharging the buckets. Around the wheels and the pulley J is placed the continuous linked belt or chain L.

Attached to the top of the frame H is the screw N, which passes up through the plate *g*, and is provided with the nut *n*, by the revolution of which on the screw N the frame H is raised or lowered within the standard G.

At the rear of the standard G is the spout O, within which at each end are attached pulleys, upon which is placed a continuous apron, to which motion is imparted by the revolution of the lowest pulley, to the shaft of which is attached the exterior belt-pulley, *o*.

Upon the horizontal shaft F is fastened the beveled-gear wheel *f*, which meshes into the beveled-gear wheel *p*, attached to the horizontal shaft P, which is supported upon the side of the frame A. Upon the shaft P is fastened the second beveled-gear wheel, *p'*, which meshes into the corresponding beveled-gear wheel, *q*, upon the vertical shaft Q. The upper end of this shaft passes through the supports *h h'*, which are rigidly attached to the frame H. The upper portion of the shaft Q is angular-shaped, and passes through the beveled-gear wheel g^2, which is placed on the shaft between the supports *h* and *h'*. The gear-wheel q^2 is fitted upon the square portion of the shaft Q, so as to revolve with it, and at the same time slip up or down its length as the frame H is raised or lowered. It also meshes into the beveled-gear wheel *k*, which is attached to the shaft to which the sprocket-wheel K is rigidly fastened, the motion communicated causing the sprocket-wheel K to revolve, and as the wheel is provided with projections which engage in the links of the continuous belt L the latter is given the requisite motion. The other

end of the shaft, upon which is mounted the sprocket-wheel K, is provided with a small belt-pulley, *o'*, from which a belt passes to the pulley *o*, thus giving motion to the continuous apron within the spout O.

The horizontal shaft F is provided at the opposite end from the pulley E with the gear-wheel *f'*. The roller C in front of the machine is also provided with an exterior gear-wheel, *c*, upon the same side of the machine as the gear-wheel *f'*, and the two are connected by any suitable system of gearing, the preferable form being such as will give the roller C one revolution to two hundred and fifty of the shaft F.

The cups or buckets M are attached to the links of the continuous chain or belt L, and are somewhat similar in construction to the ordinary elevator-bucket, except that they are each provided in front with a sharp knife or cutting-edge, *m*, running the whole length of the cup. This knife-edge is preferably made of steel, and is attached by suitable means to the edge of the cup. This cup M may be formed so as to present a straight edge or curved edge, to conform to the contour of the tile to be laid in the ditch. The rear portion of the cup adjacent to the link is cut away, and within the cup is attached a movable back, *n'*, hinged or pivoted at the top, so as to swing forward and discharge the contents of the cup. To the rear of this movable back is attached the spur or curved projection n^2.

The sprocket-wheel J is provided with a series of projections, *j*, which engage within the links of the chain L, and by striking against the spur n^2 force the movable back forward in the cup, so as to discharge its contents upon the continuous apron with the spout.

I am aware that the movable backs are not new, and do not claim them broadly, my invention being limited to the described simple device for moving their backs.

The links are united to form the chain L, in any of the well-known forms suitable to the case. A portion of the links forming the chain L, instead of being provided with buckets, may be provided with knives Z, having cutting-edges, and corresponding in their outline to the cutting-edges attached to the buckets with a width sufficient to give them strength, as clearly shown in Fig. 3, the arrangement of the links being such as to provide a succession alternately of cups and cutting-knives; but this I do not claim.

The advantage of this form of construction is that the cutting-knives, having no weight to carry, cut away and loosen the earth to better advantage, and thus relieve the buckets from a portion of their labor.

The mode of operation of the machine is as follows: The machine is placed in position over the line of the proposed ditch, and the cable attached to the roller C is anchored some distance in advance of the machine. The interior frame, H, is lowered within the standard G to the depth required to be cut, either at once into a hole in the earth or gradually as the machine is drawn forward. Power is applied from the stationary engine on the frame, when, by the movement of the endless linked chain L, the cups cut away the earth in front and carry it up over the sprocket-wheels J and K and empty it upon the endless apron in the spout O.

When it is desired to lay the tiles this is done by hand immediately in the rear of the the machine under the spout O, and the earth from the spout falling into the ditch covers the tiles and fills in the ditch again.

If tile are not laid in and a ditch alone is required, a short supplementary spout may be attached to the rear of the spout O in such a manner as to throw the earth to one side of the ditch. In the meantime the slow revolution of the roller C winds upon the cable, and thus propels the machine forward until the anchor is reached, when a new anchorage is obtained and the process is continued as before.

By the use of this machine a ditch may be dug of any required length, and, if desired, tiles laid and covered with great rapidity and much more cheaply than by the methods heretofore pursued, in which the earth is first excavated and then by a second operation shoveled into the ditch to cover the tile.

Having thus described my invention, what I claim is—

1. In a ditching-machine, the combination of the horizontal frame, vertical standard fixed thereto, and vertically-sliding frame H, said sliding frame having a lower and two upper sprocket-wheels carrying a belt and buckets, said upper sprocket-wheels being arranged with the rear lower than the forward and in the described relation to the discharge-spout O, all as set forth.

2. The combination of the buckets M, attached in the chain as described, with the hinged bottom *n'* and spur n^2, and the projections *j* on the sprocket-wheel J, substantially as described.

WILLIAM WILSON.

Witnesses:
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JAS. M. EVANS.