

May 19, 1925.

A. LÖKEN

1,538,565

POWER DRIVEN DITCH DIGGING MACHINE

Filed Nov. 26, 1920

2 Sheets-Sheet 1

Fig. 1.

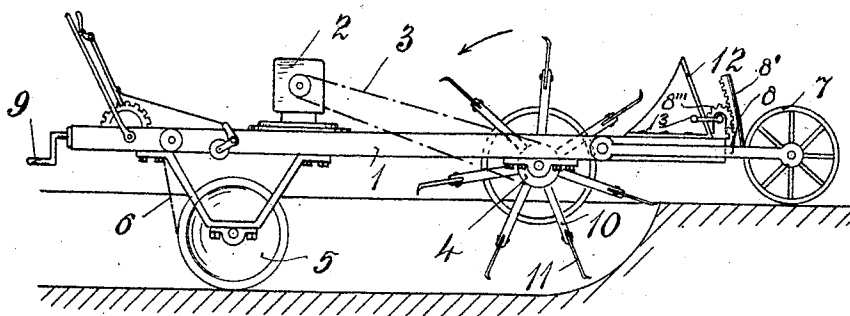


Fig. 2.

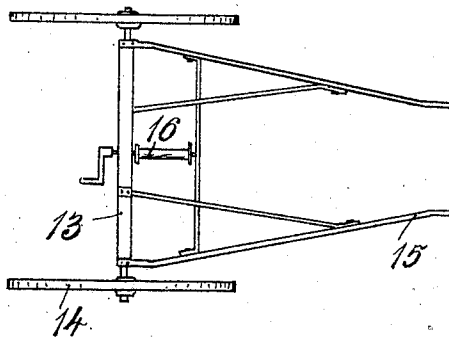


Fig. 4.

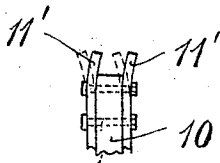


Fig. 3.



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Fig. 1a.

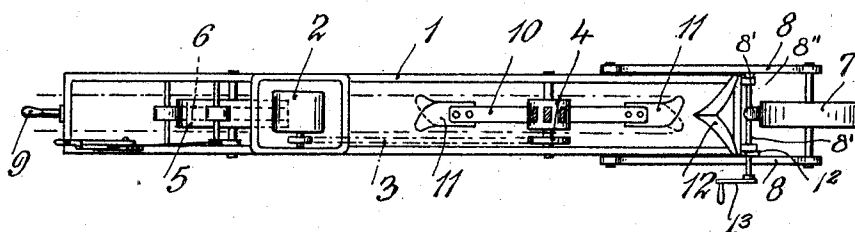
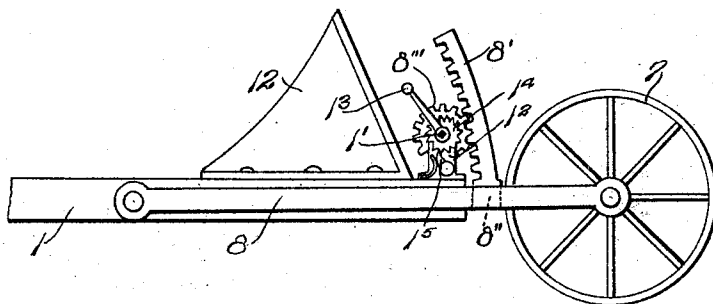


Fig. 5.



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UNITED STATES PATENT OFFICE.

ANDERS LÖKEN, OF BOLTORP, MYSEN, NORWAY.

POWER-DRIVEN DITCH-DIGGING MACHINE.

Application filed November 26, 1920. Serial No. 426,458.

To all whom it may concern:

Be it known that I, ANDERS LÖKEN, a subject of the King of Norway, residing at Boltorp, Mysen, Norway, have invented certain new and useful Improvements in Power-Driven Ditch-Digging 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 motor driven ditch digging machines and has for object to provide machines of this kind especially suitable for the digging of drain ditches and other ditches. This I obtain by using as digging means a wheel, disc or the like, provided with claws or steels of a width corresponding to the width of the ditch to be dug, said wheel or disc being put in so rapid rotation as to act in a similar manner as a buzz saw, scratching loose and throwing the earth or clay upwards in shape of a spray, said wheel or disc being simultaneously with this rotation advanced in a ratio adapted to let the claws, pins or steels scratch off and sweep up very thin layers of earth, loam, clay etc.

An apparatus in accordance with my invention is diagrammatically illustrated by way of example in the accompanying drawings, in which Fig. 1 is a side view of the apparatus. Fig. 1^a is a plan view thereof. Fig. 2 is a plan view of an auxiliary apparatus. Fig. 3 is a plan of the working end of a claw. Fig. 4 shows a modified form of the claws. Fig. 5 is an enlarged detail side view of the frame-adjusting mechanism. The machine comprises a frame 1, on which is mounted a motor 2 (electric motor or internal combustion motor) driving the digging wheel 4 by means of a chain transmission 3. The frame is carried by a wheel or roller 5 mounted below or substantially below the motor, said wheel or roller being eventually actuated from the motor 2 by the intermediary of the chain transmission 6 and other transmissions (not shown), so as to enable this wheel to act as a propeller for the machine. In the executional form illustrated this wheel 5 moves on the bottom of the ditch dug by the digging wheel 4. In front of the digging wheel 4 is arranged

a carrying wheel 7 running on the ground. This carrying wheel may preferably be arranged vertically displaceable in order to vary hereby the depth of the ditch dug by the wheel 4. In the drawings the wheel is shown as journalled between arms 8, which are displaced in different angles by aid of an arcuate rack 8' which connects the arms 8 in front of the frame 1, said rack being in mesh with a pinion 8'' fixed on a rotary shaft 1' journaled in standards 1² mounted on the front end of said frame. The pinion may be rotated by means of a crank 1³ fixed on the end of the shaft 1'. The shaft also has fixed thereon a ratchet wheel 1⁴, and a pawl 1⁵ mounted on one of the standards engages the ratchet so as to lock the shaft and sprocket, and thereby hold the arms 8 in their adjusted position with relation to the frame.

The machine being carried only by a front and a rear wheel works with unstable equilibrium transversely and is steered by hand by aid of a handle 9 or the like. The wheel 4 is provided with a number of arms 10, each of which are provided with digging claws, steels or pins 11, said claws or steels being elastic in themselves or provided with an elastic fastening device in order that they shall not be broken when they strike against firm rock or large stones. In front of the wheel is placed a screen 12, directing the spray flung up by the digging wheel to the side of the machine. The digging wheel claws, steels or pins have such form that they cut out a free path for the wheel itself. For this purpose alternate claws or steels, each consisting of two parts 11' (Fig. 4), may be offset or extended outwards as shown in Fig. 3 to the right and to the left respectively in such way as to produce an effect similar to the set of the teeth in a saw. During the continuous advance of the machine each of said steels 11 or its parts 11' respectively scratch off a very thin layer of earth or loam and hurls it in form of a spray tangentially upwards. Small stones and roots are also removed in this way without any difficulty. If the operator from violent funkung (sparks) from the digging wheel understands that the wheel is working against a large stone, he is of course obliged to have the machine stopped until the stone has been removed. It is clear that the carrying wheel or roller 5 and the supports in which it is journalled must be of somewhat lesser width than the

width of the ditch dug out by the digging wheel. In order to be able to control that the ditch dug out by the machine is getting sufficient inclination, it may be suitable to place a pendulum, level or the like (not shown) on the machine frame.

As will be seen the essential feature of the machine resides therein that it works by aid of rapidly rotating arms, claws or teeth, each of which only scratch off a very thin layer of earth or loam, so as to act similar to a buzz saw.

For transport of the machine from one place of action to another, it may suitably be provided with an auxiliary apparatus formed as a rear carriage 13 (Fig. 2), having a pair of carriage wheels 14 and provided with arms 15, adapted to be fastened to the machine frame 1 of the machine. The rear carriage is provided with a winch arrangement 16 of any suitable kind, by aid of which the rear part of the machine part 1 together with the motor 2, the carrying wheel 5 and the digging wheel 4 may be raised up above the ground in such way that the machine as a whole will rest on the pair of wheels 14 and the front carrying wheel 7. In this position the machine may be drawn by a horse or the like from one place of action to another. It will be seen that this machine works in such way as to make it possible to dig out the ditch to its full depth in a single operation.

If the machine is to be used in marshy ground it will be difficult to have it propelled by aid of the wheel 5 as described above. In such case it may be necessary to have it drawn forward by aid of a wire that is wound up by aid of a winch. In such case the auxiliary carriage 13 may be used for supporting the machine.

I claim:

1. In a motor driven and motor carrying ditch digging machine, a narrow rectangular frame, a rotary cutter, compris-

ing a rotary shaft journaled in the longitudinal sides of the frame, a plurality of rigid radial arms mounted in the shaft, flexible cutting blades mounted on the free ends of the arms, a wheel for driving the frame mounted behind and in alinement with the cutter, supporting arms adjustably connected to the longitudinal sides of the frame and extending beyond the front end of the latter, a supporting wheel journaled in the supporting arms, a motor mounted on the frame behind the cutter, driving means connecting the motor and cutter adapted to rotate the latter at high speed to create a suction, and means for deflecting the spray of earth flung up by the cutter.

2. In a motor driven and motor carrying ditch digging machine, a narrow rectangular frame, a rotary cutter, comprising a rotary shaft journaled in the longitudinal sides of the frame, a plurality of rigid radial arms mounted in the shaft, flexible cutting blades mounted on the free ends of the arms, a wheel for driving the frame mounted behind and in alinement with the cutter, supporting arms adjustably connected to the longitudinal sides of the frame and extending beyond the front end of the latter, a supporting wheel journaled in the supporting arms, means for adjusting the latter to bring the cutting blades into position for scratching the earth, a motor mounted on the frame behind the cutter, driving means connecting the motor and cutter adapted to rotate the latter at high speed to create a suction, and means for deflecting the spray of earth flung up by the cutters.

In testimony that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

ANDERS LÖKEN.

Witnesses:

M. W. KAHRS,
L. E. MARTENS.